WATER WORKS & SEWERAGE

FILTRATION PLANT AND PUMPING STATION, WEST PALM BEACH WATER COMPANY

Water can be either friend or foe. When it carries disease, water is a deadly foe. Chlorine makes it a friend.

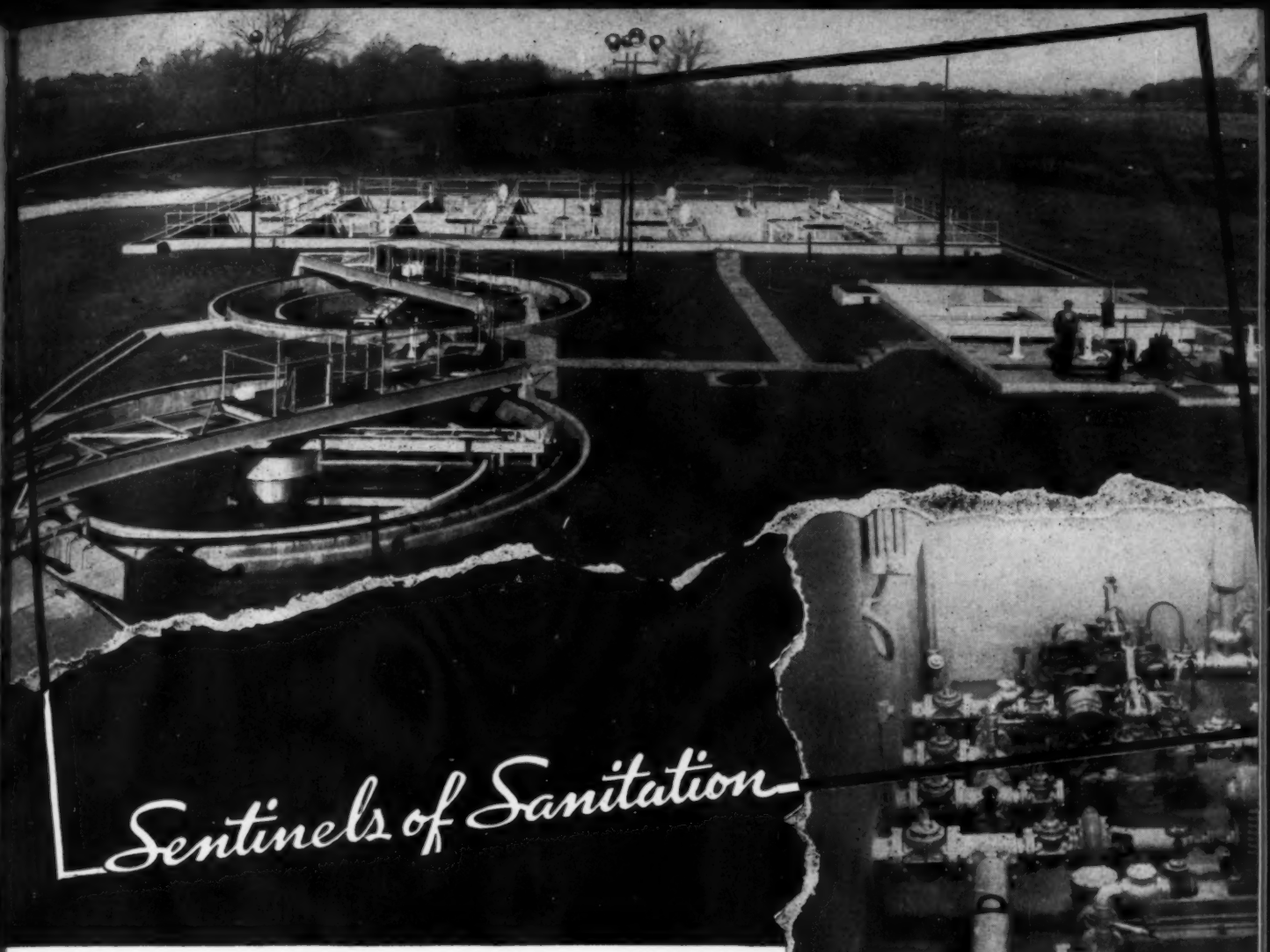
Chlorine's protective armor against water-borne disease is defending our armed forces everywhere. In base hospitals Chlorine guards wounds against bacteria, in camp laundries it protects clothes, in foot baths it battles common fungus infections. And everywhere, Chlorine and its compounds are helping make drinking water safe.

It is to these purposes that the principal output of Penn Salt Chlorine Products are dedicated right now. As you can see, military demands must be answered first. But while this is happening a vast fund of experience and expanded facilities is being created. And this will be dedicated to the more effective service of our customers when peace returns again.

PENNSYLVANIA SALT
MANUFACTURING COMPANY
Chemicals
1000 WIDENER BUILDING, PHILADELPHIA 7, PA.
New York • Chicago • St. Louis • Pittsburgh • Minneapolis • Wyandotte • Tacoma

Penn Salt manufactures
LIQUID CHLORINE
for water sanitation and sewerage treatment
also
Perchloron* • Anhydrous Ammonia
Filter Alum • Ferric Chloride
Sodium Aluminate • Chloride of Lime
Caustic Soda and other products
*Trade-mark Reg. U. S. Pat. Off.

WATER WORKS & SEWERAGE, July, 1944, Volume 91, Number 7. Published monthly by Gillette Publishing Co., 330 South Wells Street, Chicago, Ill. Per copy, 25c. Subscription rate, United States, $2.00 per year; Canada, $2.00 per year; Foreign, $3.00 per year. Entered as Second Class Matter, June 2, 1931, at the Post Office at Chicago, Ill., under act of March 3, 1879.

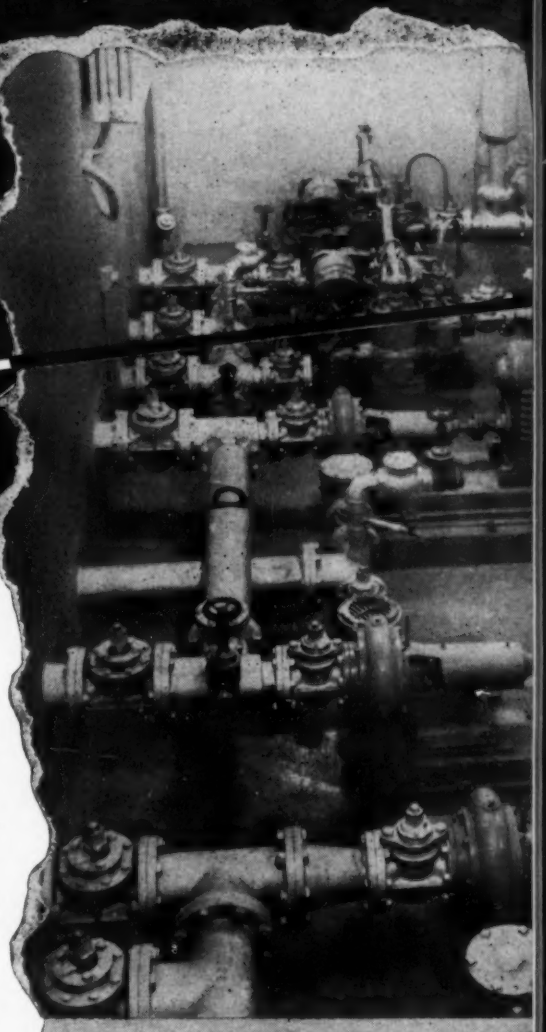


Sentinels of Sanitation

In today's advanced sewage treatment practices, meters provide the eyes and ears; valves the hands that operators need to intelligently run their plants.

It is of importance for the operator to know "how much" and "when". In this category he should measure the gas generated within the plant as well as that purchased from the local utility. The water consumed, hot or cold, is another item to be held under meter control. EMCO Sewage Gas Meters and Pittsburgh-National Water Meters are performing these functions in hundreds of treatment plants throughout the country.

Nordstrom Valves are in a class by themselves for controlling sludge, gas and water flow in disposal plants. Lubricated for both ease of operation and as a protection against corrosion and erosion, these quick, quarter turn valves are nationally recognized as the superior control medium for this type of service.



The extremely modern sewage plant at Greece, N. Y. is pictured above. Naturally one finds many Nordstrom Valves installed on vital flow lines throughout this structure. A battery of these quick operating, leak resistant valves can be seen in the accompanying photo installed on sewage sludge lines in the pump room.

PITTSBURGH EQUITABLE METER COMPANY

ATLANTA, BOSTON, BROOKLYN, BUFFALO, CHICAGO, COLUMBIA, HOUSTON

MERCO NORDSTROM VALVE COMPANY
Main Offices, Pittsburgh, Pa.
NATIONAL METER DIVISION, Brooklyn, N. Y.

KANSAS CITY, LOS ANGELES, NEW YORK, PITTSBURGH, SAN FRANCISCO, SEATTLE, TULSA

PITTSBURGH-NATIONAL WATER METERS • EMCO SEWAGE GAS METERS • NORDSTROM LUBRICATED VALVES

Aluminum Grating

IS SAVING MANPOWER AND MATERIALS

Aluminum grating went to work in sewage treatment plants, water works, chemical and processing plants long before the war. None has been made recently, of course, because all available aluminum was needed for military equipment. But these years of manpower and material shortages have proved the economic worth of aluminum grating.

Made of aluminum alloys having high resistance to corrosion, it is usually not necessary to safeguard it against attack by any protective coating. Think what never having to paint your grating would save you. And you could forget your fears that corrosion is weakening your grating, if you are forced by lack of help or time to neglect it.

Aluminum grating can be made nonslip by corrugations in the surface of the metal or by abrasive, nonslip fillers. The shapes from which it is fabricated make possible maximum strength and stiffness, while retaining aluminum's advantage of light weight and easy handling. Because aluminum is nonsparking, this grating gives added safety in plants where fire and explosion hazards exist.

Alcoa does not manufacture grating; just the rolled or extruded shapes from which it is made. Consult your usual supplier on the possibility of obtaining aluminum grating to replace rusted-out grating or for new construction. ALUMINUM COMPANY OF AMERICA, 1955 Gulf Bldg., Pittsburgh 19, Pa.

ALCOA ALUMINUM

Song of the Desert

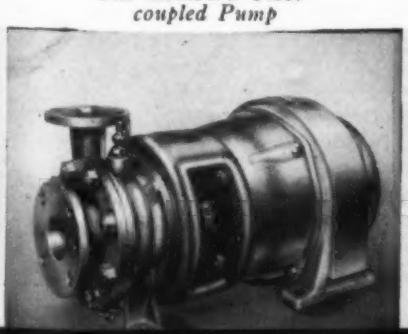
NO longer do the harsh overtones of sun and cactus, wind and boiling sun echo through the vast emptiness of the desert. Today orchards give a lush soliloquy to the muted voices of happy farm workers. The vibrant sun is now a friendly ally for the thirst quenching water. Lombard Irrigation Pumps have played their part in transforming death into life. Lombard Hydraulic Equipment is doing vital work in many fields.

LOMBARD *Governor* **CORPORATION**

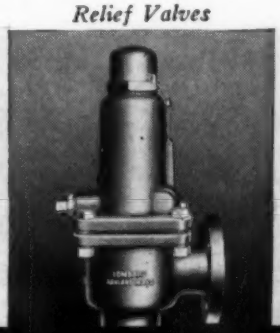
ASHLAND - MASSACHUSETTS

Sales Office: 60 East 42nd Street, New York 17, N. Y.

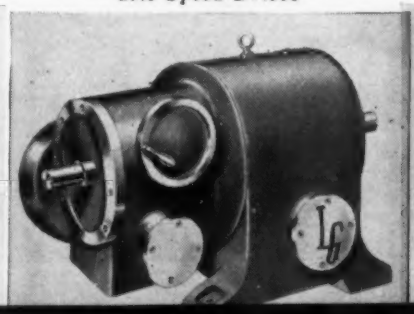
The Lombard Close-coupled Pump



Relief Valves

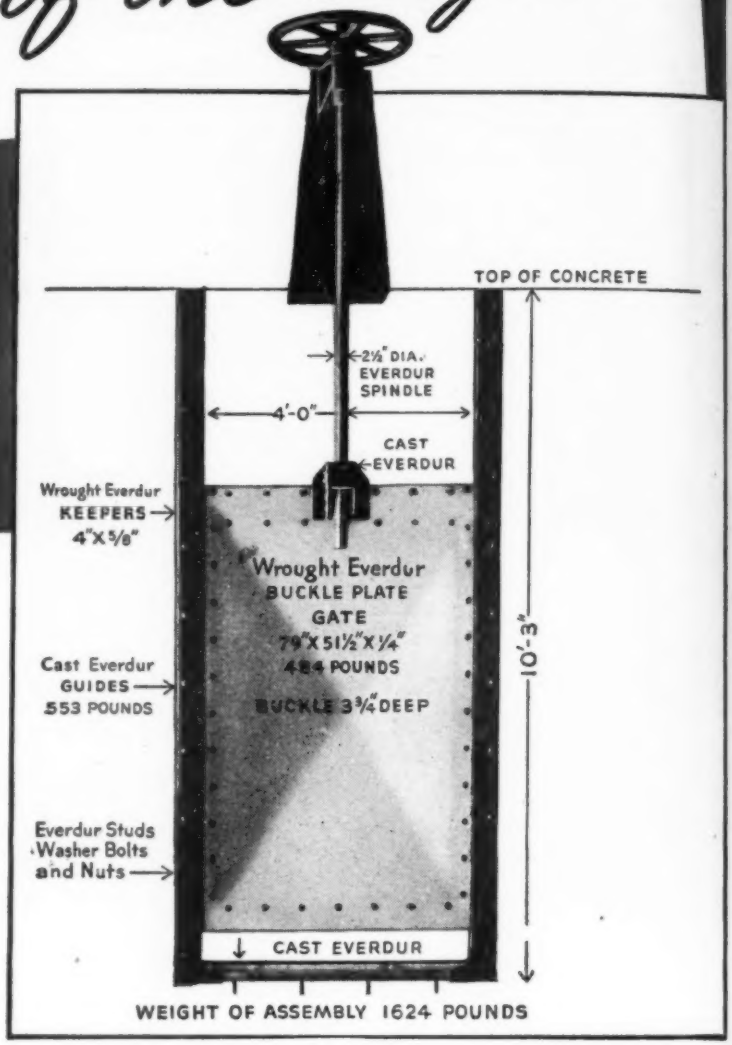


Compact, efficient Variable Speed Drives



One-fifth of the weight

PLUS... LONG LIFE LOW COST EASY OPERATION



● Since their installation over ten years ago, five shut-off gates of Everdur Metal* have been giving complete satisfaction in the screen room of the Rahway Valley Joint Meeting Sewage Treatment Works, Rahway, New Jersey.

But long life is only part of the Everdur story. These gates operate smoothly and easily by hand, since their weight is but *one fifth* that of ribbed cast iron electric-driven gates. Everdur provides high strength plus the corrosion resistance of copper, yet is moderate in cost. It is readily welded, worked hot or cold, and is available in practically all commercial shapes.

For detailed information on Everdur Metal in Sewage Treatment, Reservoir and Water Works service, write for Booklet E-11. 44130

*Reg. U. S. Pat. Off.

THE AMERICAN BRASS COMPANY
Subsidiary of Anaconda Copper Mining Company
General Offices: Waterbury 88, Connecticut
In Canada: ANACONDA AMERICAN BRASS LTD., *New Toronto, Ont.*

EVERDUR METAL

is being used for Coarse and Fine Screens, Swing Gates, Built-up Sluice Gates, Coarse Bar Rack Aprons, Effluent Weirs and Scum Weirs, Structural Scum Baffle Brackets, Troughs, Screen Hoppers, Orifices, Baskets, Anchors, Ladders, Float Gage Chains, Valve Springs, Manhole Steps, Guides, Walkways, Bars and Plates, Bolts and Nuts.

ANACONDA from mine to consumer

Anaconda Copper & Copper Alloys

Installing "Usiflex" flexible joint cast iron pipe for submarine crossing. Drawn by Rico Lebrun for U. S. Pipe & Foundry Co.

"Usiflex" flexible joint cast iron pipe has an outstanding performance record under difficult installation conditions such as submarine crossings and lines in swampy or unstable soils where settlement is to be expected. Other types of flexible joint pipe are also manufactured to meet these special requirements. We also produce bell-and-spigot, mechanical joint, flanged and plain end pipe in accordance with all standard or special engineers' specifications.

U.S.
cast iron
PIPE

U. S. PIPE & FOUNDRY CO.
General Offices: Burlington, N. J.
Plants and Sales Offices throughout the U. S. A.

are you planning now for BETTER POSTWAR SEWERS?

Part of 920-ft. sewer extension with ARMCO pipe under railroad and across old canal bed.

☆ ☆ ☆

Your blue-printed plans for sewer construction will play a vital part in making jobs for returning service men and workers in war industries. It is tremendously important that your plans for needed public improvements be ready and on the "shelf of projects" for immediate letting.

Those proposed sewers can avoid the ills and troubles of so many of our present sewers, which require early maintenance, frequent repairs and premature replacement. Cracks and opened joints result in undermined streets and in ground-water taxing the capacity of your sewage treatment plant.

You can prevent these troubles by specifying Asbestos-Bonded ARMCO Sewer Pipe. Flexible corrugated metal stops cracking and breakage. Band couplers make strong, tight joints. A thick bituminous pavement in the bottom checks erosion, while an overall bituminous coating is tightly asbestos-bonded to the base metal. To help you make your postwar sewer plans, ask for a copy of the 48-page ARMCO Sewer Booklet. Just write to Armco Drainage Products Association, Middletown, Ohio.

ARMCO

ASBESTOS-BONDED ARMCO SEWER PIPE

DELUGE!

....AND COMPOUND TROUBLE ON YOUR MAIN LAYING JOB

THE UNEXPECTED STORM MAY MEAN PLENTY OF TROUBLE, IF IT CATCHES YOUR JOINTING COMPOUND UNPROTECTED IN THE OPEN .... UNLESS OF COURSE

.... that compound happens to be *Tegul*-MINERALEAD. With *this* compound, in 10 lb. ingot form, there will be no days lost and labor (now at a premium) diverted, while a drying-out job has to be done.

YOU SIDESTEP TROUBLE AND COSTLY DELAYS ....

when you use *Tegul*-MINERALEAD, because water rolls right off the ingot—doesn't hurt it a bit. There's no rushing around for tarpaulin — and *Tegul*-MINERALEAD remains ready to work through the heaviest storm or flood.

Another of *Tegul*-MINERALEAD'S important advantages is that, in ingot form, its correct chemical composition cannot be upset in transit to the job, even over the roughest roads.

BUT .... WHAT SORT OF *JOINTS*?

Naturally that's the *big* question. In repeated tests, in which joints made with *Tegul*-MINERALEAD were subjected to fifteen hours pounding with a 50 lb. power hammer — 90,000 smashing impacts in all — with 90 lbs. water pressure maintained in the line — not a leak developed.

For important savings in time, trouble, labor costs and subsequent line repairs, send for complete information before you write your specifications for that next main-laying job.

THE ATLAS MINERAL PRODUCTS COMPANY of Penna.

Mertztown • Pennsylvania

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*CHICAGO 1, Ill., 333 No. Michigan Ave.
*DALLAS 5, Tex., 3921 Purdue St.
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SALT LAKE CITY 11, Utah, 1212 So. State St.
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*LOS ANGELES 12, Cal., 817 Yale St.
*SEATTLE 14, Wash., H. D. Fowler Company P. O. Box 3084

*Stocks carried at these points

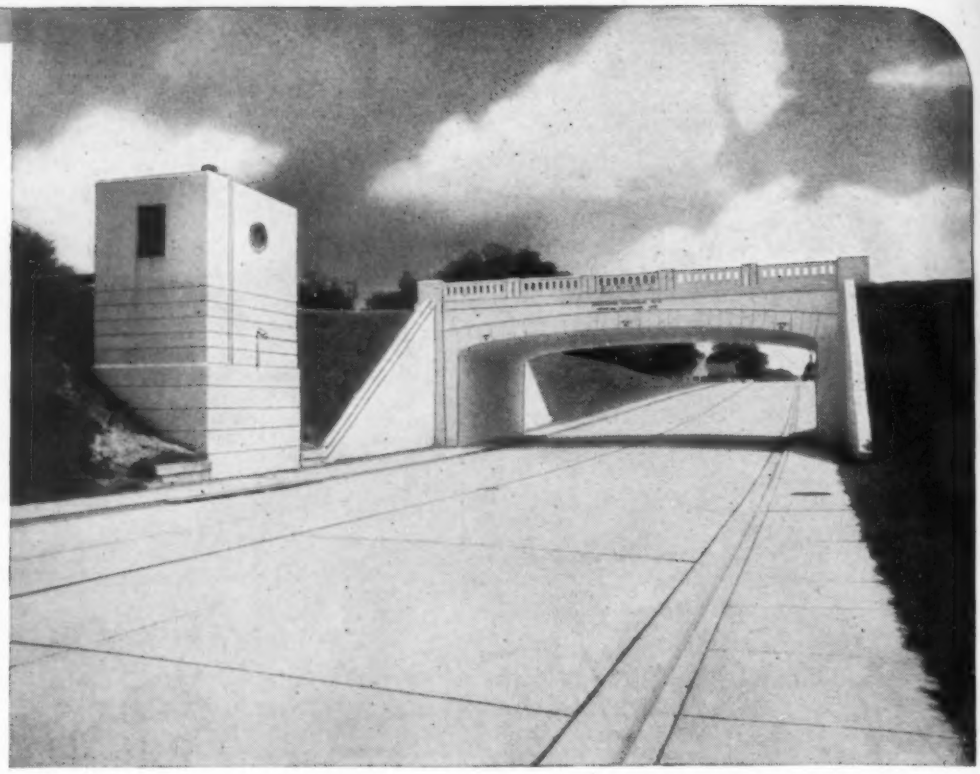
THE ATLAS MINERAL PRODUCTS COMPANY O
MERTZTOWN, PENNSYLVANIA

Tell us more about how we can save by using Te
MINERALEAD in our Bell & Spigot Main Jointing.

Firm_____

Address_____

Attention of_____



Tax Money Well-Spent!

The Florida State Road Department took no chances in building this highway underpass at Cottondale, where the terrain is as flat as a billiard table.

They knew in advance that there must be efficient and reliable provision for pumping out water as rapidly as it gathered from heavy rainfall.

Fairbanks-Morse engineers were called in on the problem and solved it. The result is two 8-inch Fairbanks-Morse Vertical Centrifugal Pumps, driven at 900 r.p.m. by Fairbanks-Morse 20-hp. Vertical Ball Bearing Motors.

The entire system is turned on and off automatically.

If your municipality has pumping problems now, or if you are planning for the future, why not consult with Fairbanks-Morse engineers? Write Fairbanks, Morse & Co., Fairbanks-Morse Building, Chicago 5, Illinois.

Here are the two 8-inch Fairbanks-Morse Vertical Centrifugal Pumping Units that keep the Cottondale underpass free from water during the heaviest rainfalls. Unit at right also connects to auxiliary gasoline engine that assures pumping during power failure emergency.

BUY
MORE BONDS

FAIRBANKS-MORSE

DIESEL ENGINES
PUMPS
MOTORS
GENERATORS
WATER SYSTEMS
SCALES
STOKERS
FARM EQUIPMENT
RAIL ROAD EQUIPMENT

Pumps

More than 50 years of continuous service prove the durability and strength of CONCRETE SEWER PIPE

This 50-year-old concrete pipe, 18 by 14 in. and 3 ft. in length, was removed on July 21, 1941, from a sanitary sewer that had been in service since 1891 in Atlanta, Georgia. The concrete pipe was in excellent condition.

This 42-in. reinforced concrete pipe sanitary intercepter was installed in Atlanta, Georgia, in March, 1936, and is a part of the $5,000,000 sewerage system completed by the City of Atlanta in 1941.

CONCRETE PIPE SANITARY SEWERS have served Atlanta, Georgia, for more than 50 years. Based on this experience a sewerage system requiring more than 84 miles of concrete sewer pipe and reinforced concrete sewer pipe, ranging in diameter from 8 to 84 in., was completed in 1941, costing more than $5,000,000.

For more than 100 years concrete pipe sanitary and combined sewers have been in service in cities of the United States. When you plan sewerage improvements, consult this Association or our members (list on request) who will gladly furnish technical and practical information on construction of concrete pipe lines in open cut, in tunnel and by the jacking method.

American Concrete Pipe Association

33 West Grand Avenue, Chicago 10, Illinois
342 Munsey Building, Washington 4, D. C.

BUY MORE WAR BONDS

HEY! LEAVE THAT "PUTT-PUTT" ALONE

No soldier, you don't have to monkey around with that Homelite Portable Gasoline-engine-driven Generator.

You don't have to check the oil level . . . the oil is mixed with the gasoline and fresh, clean oil sprays over all moving parts at each revolution. For the same reason, there's no need to shut-down the unit to change oil . . . there's no oil sump to collect sludge.

The engine is air cooled . . . so there's no water level to be checked.

No adjustments are required when the load on the generator changes . . . a simple built-in governor automatically keeps the engine at a constant speed.

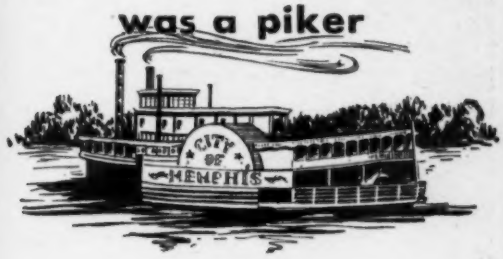
When it comes to operating electric tools, floodlights, landing field marker lights, or even radio equipment . . . this simplicity of operation has proved an important advantage to all the branches of our armed services. Less time is required to keep the Homelite generators operating . . . more time can be given to the number one job . . . winning the war.

You don't need an expert to run a Homelite Portable Generator. It's as foolproof as possible. Send it out on any repair or emergency job and tell your men to set it up . . . start it . . . and leave it alone. Without any fussing around or manual attention, your Homelite Portable Generator will give you all the dependable power you need to operate floodlights or time-saving electric tools.

HOMELITE CORPORATION

PORT CHESTER, NEW YORK

"Old Man River" was a piker



When the Flat River near Durham, North Carolina, let the residents of Durham down during an exceptionally dry year, an extensive modernization program was undertaken throughout the water works system. To guard against another water shortage, an impounding reservoir was constructed, including a hydro-electric development to harness the power available during normal and wet seasons. As an integral part of this modernization program the Horton elevated storage tank shown at the left was erected. Almost immediately after the completion of this 1,500,000-gal. tank, pressure charts revealed a decided increase in the efficiency of the distribution system. In addition to the water held in elevated storage, the Durham water works system has 3,500,000 gals. in reservoirs.

In contrast to rivers which may fail, Horton elevated storage tanks can faithfully serve municipalities for years providing benefits through many types of emergencies.

Horton elevated storage tanks provide municipalities with many benefits such as: maintenance of an ample water supply immediately available for fire protection, adequate reserve in case of power failure and provision for pumping during off-peak periods. We invite inquiries from water works engineers planning postwar water supply systems. Write our nearest office, there is no obligation. Also ask for bulletin entitled "The Distribution System — Some Basic Considerations in Its Design, Maintenance and Operation."

CHICAGO BRIDGE & IRON COMPANY

Chicago 4.....2198 McCormick Bldg.
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Cleveland 15.....2262 Guildhall Bldg.
Havana.....402 Edificio Abreu
Birmingham 1.....1586 North 50th Street
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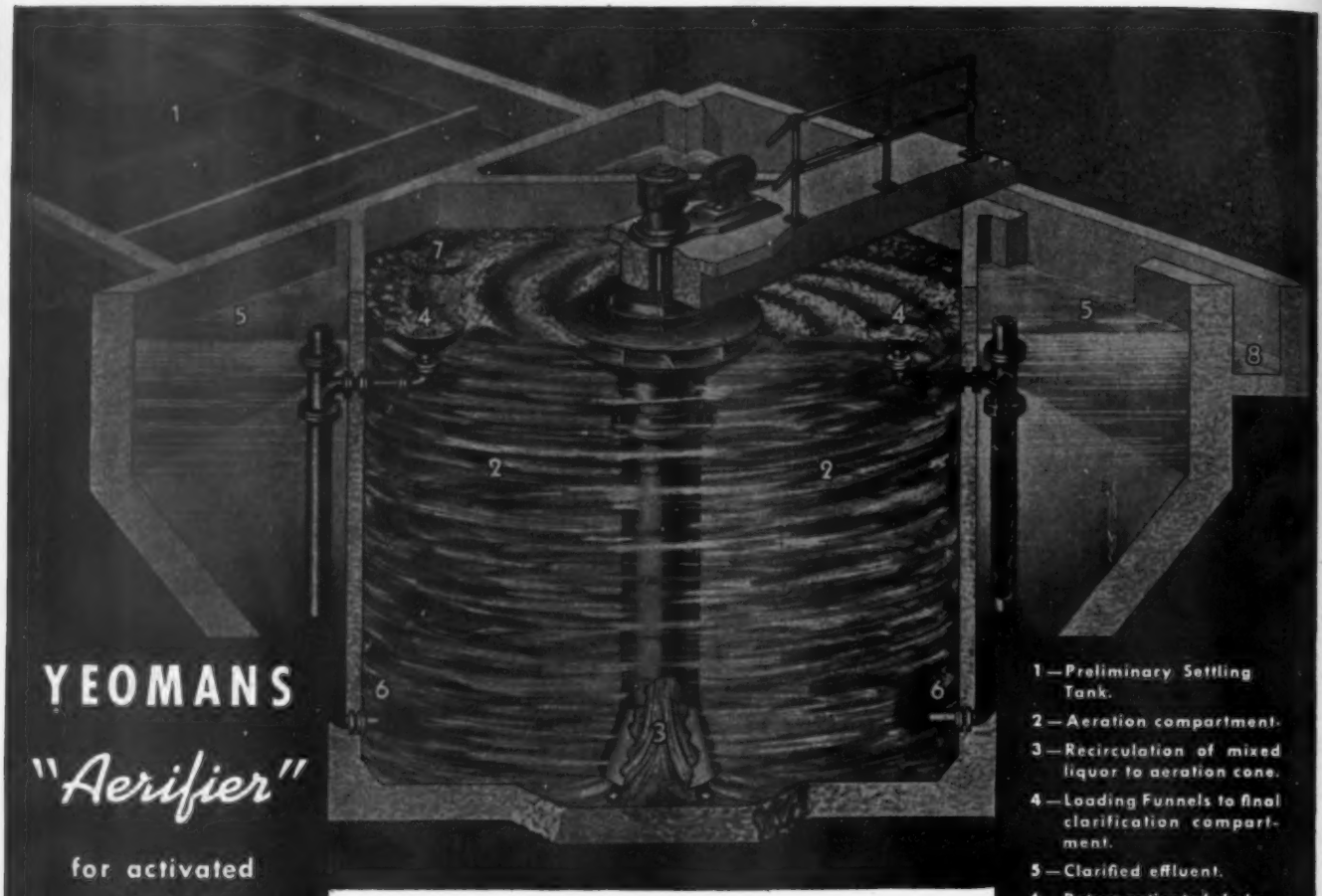
Tulsa 3.....1646 Hunt Bldg.
Houston 1.....5615 Clinton Drive
Philadelphia 3.....1644-1700 Walnut Street
Washington 5.....330 Bowen Bldg.
San Francisco 5.....1083 Rialto Bldg.
In Canada: Horton Steel Works, Limited, Fort Erie, Ont.



YEOMANS "Aerifier"

for activated sludge treatment of sewage

1—Preliminary Settling Tank.
2—Aeration compartment.
3—Recirculation of mixed liquor to aeration cone.
4—Loading Funnels to final clarification compartment.
5—Clarified effluent.
6—Return activated sludge.
7—Waste activated sludge loading funnel to primary tank.
8—Plant effluent.

AERATION AND FINAL SETTLING IN ONE CONCRETE STRUCTURE

HERE'S an answer to the sewage problem of small communities—the Yeomans "Aerifier". It is designed and built to do an efficient job economically—with a minimum of attention for operation and maintenance.

Square concrete tank, with central aeration section and triangular corner settling compartments, connected only by influent and effluent pipes. No steel baffles to rust and collapse.

Motor-driven "Spiralflo" aeration cone revolving at relatively low speed, sets up spiral circulation from top down—delivers a high degree of purification at exceptionally low power cost.

Exclusive design for conveying mixed liquor to settling compartments. Capacity under control of the operator.

No possibility of short circuiting from aeration compartment to clarifier. No annular openings.

Adequate velocity from "Spiralflo" movement—no sludge deposit on tank bottom. Activated sludge is returned from settling compartments to aeration compartment, and clear effluent is discharged. Waste activated sludge is returned directly to the primary tank.

For full detailed information concerning this simple, efficient, modern unit, send for new Bulletin 6650.

Yeomans Brothers Company

1423 NORTH DAYTON STREET
CHICAGO 22, ILLINOIS

YEOMANS PUMPS · GIVE YEOMAN SERVICE ·

Please send Bulletin 6650 describing Yeomans Aerifier.

Name_____

Address_____

Company_____

Transite Pipe is Easy to Handle

TRANSITE PIPE is light in weight—mechanical equipment is needed only for the larger sizes. Other outstanding features that make J-M Transite Pipe the preference of thousands of communities throughout the United States, as well as in hundreds of military camps and bases here and abroad are:

Rapid Assembly—The Simplex Coupling means rapid, economical assembly, even by inexperienced crews.

Tight, Flexible Joints are provided by Simplex Couplings. They allow deflections up to 5° at each joint, permit wide sweeps with straight lengths.

No Tuberculation—because Transite is of non-metallic, asbestos-cement composition. Tubercles can never reduce its high flow coefficient (C-140).

Low Maintenance—The high corrosion-resistance of Transite, and the resiliency of the Simplex Coupling are factors which contribute to Transite's low maintenance costs.

For complete details, send for brochure TR-11A. Johns-Manville, 22 East 40th Street, New York, 16, N. Y.

JOHNS-MANVILLE JM PRODUCTS

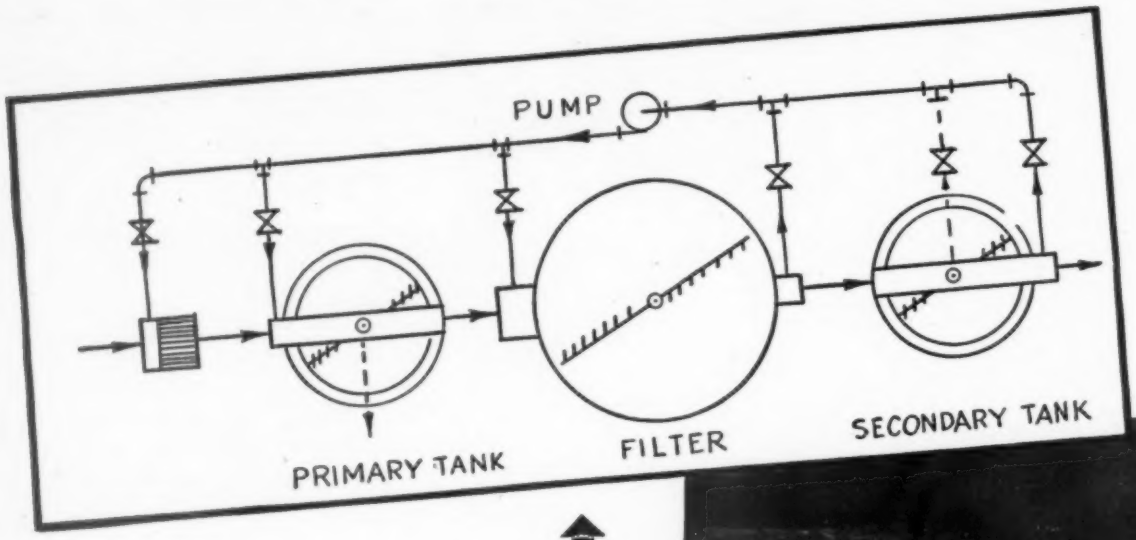
JOHNS-MANVILLE *Asbestos*

Transite Pipe

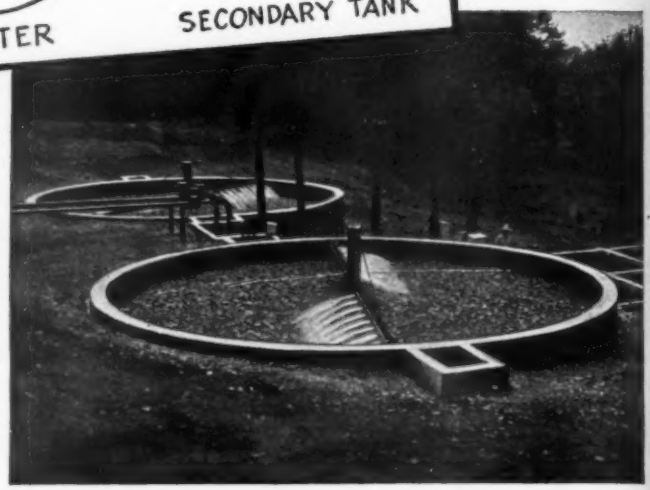
FOR EFFICIENT, ECONOMICAL WATER AND SEWER LINES

GRAVER BIO-CIRCULATOR

A Biological Filter Offering Maximum Treatment Efficiencies



Typical diagram of Graver Bio-Circulator System.



Graver Bio-Circulator Installation.

The Graver Bio-Circulator is a biological treatment system employing high rate filtration with recirculation of filter effluent, secondary effluent, or secondary sludge. Recirculation can be varied to meet necessary requirements, and to afford maximum treatment efficiency at minimum operating cost.

THE BIO-CIRCULATOR OFFERS . . .

- **economical primary, intermediate, or secondary treatment.**
- **low or high rate, single or multi-stage plants.**
- **treatment of domestic or organic industrial wastes.**
- **guaranteed results.**
- **full protection against patent problems.**

To obtain recommendations, drawings, and estimates — write to

GRAVER

SEWAGE TREATMENT EQUIPMENT

Process Equipment Division
of

GRAVER TANK & MFG. CO., INC.

4809-43 Tod Ave., East Chicago, Ind.

NEW YORK CATASAUQUA, PA. CHICAGO TULSA

Clarifiers, Primary and Secondary—Coagulators
Digesters—Gas Holders—Sewage Treatment Plants
Water Conditioning

In Peacetime or War
DIAMOND CHLORINE
HELPS YOU SAFEGUARD WATER TREATMENT
Your vital work of guarding health through water purification and treatment is aided by the dependable uniformity of DIAMOND LIQUID CHLORINE. Through years of experience, engineers everywhere have learned they can always RELY ON DIAMOND.
Whether you buy in cylinder or carload lots, DIAMOND LIQUID CHLORINE comes to you in convenient containers—individual cylinders, multi-unit or single-unit tank cars as you require.
DIAMOND ALKALI CO.
PITTSBURGH, PA. AND EVERYWHERE

SIMPLEX

Permanent PITOT TUBES with MO METER FOR ACCURATE RATE OF FLOW MEASUREMENT

FOR

LARGE MAINS

PENSTOCKS

MAIN DISTRIBUTION LINES, ETC.

In frequent instances it is found impractical to install the Venturi tube or other similar forms of primary pressure producing devices in a pipe line, because of initial cost or inability of such a device to be inserted in an existing line.

Many plants are using Simplex Type PH or Type PFA pitot rods as effective and inexpensive head producing devices, used in conjunction with a Simplex MO meter register. The Type PH Pitot Rods permit the meter instrument to respond promptly to wide instantaneous changes in flow rate. The Type PFA Pitot Rod has the impact and reference orifices combined in one tube, and is recommended for permanent use where instantaneous flow variations are not excessive.

The accuracy of the flow rate reading obtained by an installation using Simplex Pitot Rods and MO Meters is comparable in all respects with the accuracies provided by a Venturi tube.

Simplex Pitot Rods are installed in existing lines without undue interruption in plant operation, and our Sales Department will gladly provide full engineering details involved in any particular application.

SIMPLEX VALVE & METER COMPANY

6743 UPLAND STREET, PHILADELPHIA 42, PA.

Taste and Odor Patrol

Every water purification man knows that all surface water supplies are subject to pollution from industrial wastes, or organisms such as algae, and that the degree of pollution may vary widely year by year or hour by hour. Water purification plant personnel cannot always predict when a surge of pollution will affect them and therefore must be on a continuous taste and odor patrol. Many plants throughout the country are adopting the Threshold Odor Test as a regular laboratory test, so that proper treatment can be used. Granular Nuchar used for producing odor-free water will be supplied promptly to get you started with your taste and odor patrol program.

Ample stocks of Aqua Nuchar Activated Carbon should be kept on hand ready for use when tastes and odors become intense enough to occasion consumer complaint.

Most tastes and odors normally present in surface water supplies can be removed by Aqua Nuchar Activated Carbon—and at a very minor annual per capita cost. Keep a good supply on hand. It is your guarantee against taste and odor problems that arise suddenly.

BLUEPRINT NOW!

But above all, remember there is a war yet to be won. Maintain equipment to assure operation at 100% efficiency.

NUCHAR

INDUSTRIAL CHEMICAL SALES

DIVISION WEST VIRGINIA PULP & PAPER COMPANY

230 PARK AVENUE, NEW YORK 17, N.Y. — 35 E. WACKER DRIVE, CHICAGO 1, ILLINOIS — 748 PUBLIC LEDGER BLDG., PHILADELPHIA 6, PA. — 844 LEADER BLDG., CLEVELAND 14, OHIO

IMPORTANT

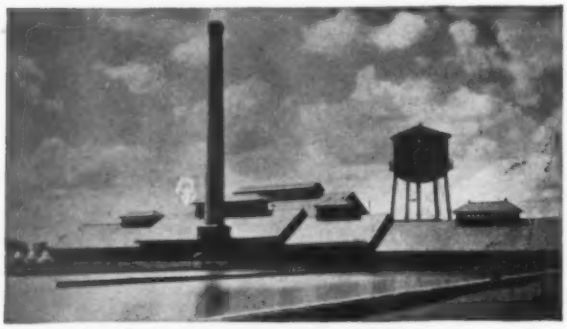
Public Health must be maintained!

The necessity of maintaining public health in war time is self-evident. Municipal officers in charge of water purification and sewage disposal have a vital responsibility in guarding the nation's health which should not be underestimated as a contributing factor to final victory.

However, the problems of maintaining public health are *becoming increasingly difficult in the face of material shortages and transportation handicaps.* General's "Alum" will help do the job right. But to ease the situation in regard to *Aluminum Sulfate* as much as possible, won't you place your orders as far ahead as you can so that we may schedule our production on an efficient basis.

Why Most American Cities Prefer General Chemical Aluminum Sulfate

General Chemical Aluminum Sulfate is an especially developed "Alum." High quality and constant uniformity have given it a *time-tested* reputation among water works engineers and sewage plant operators, who know its reliability through experience.



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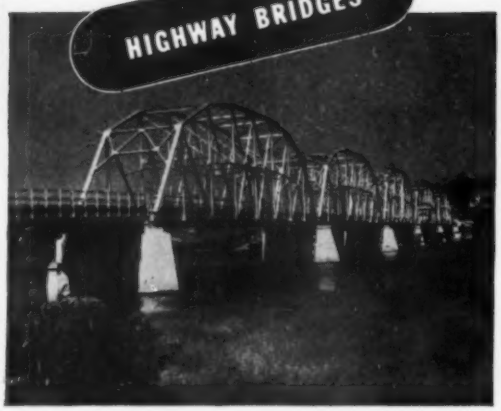
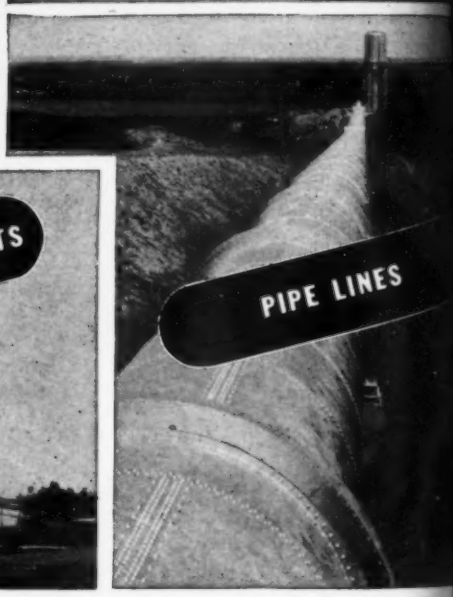


DISPOSAL PLANTS



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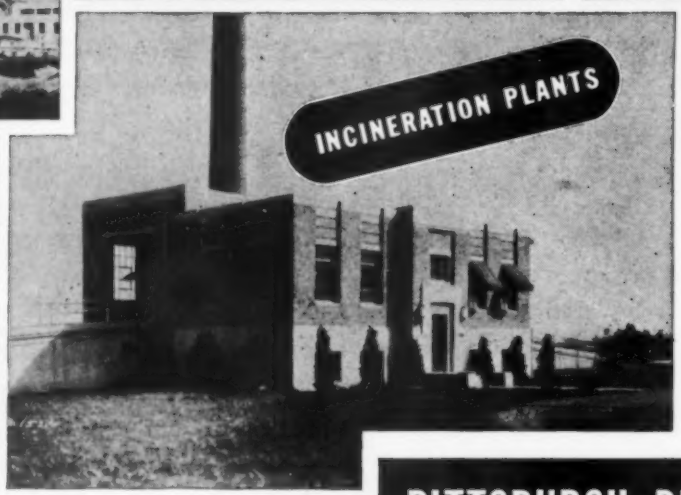
INCINERATION PLANTS



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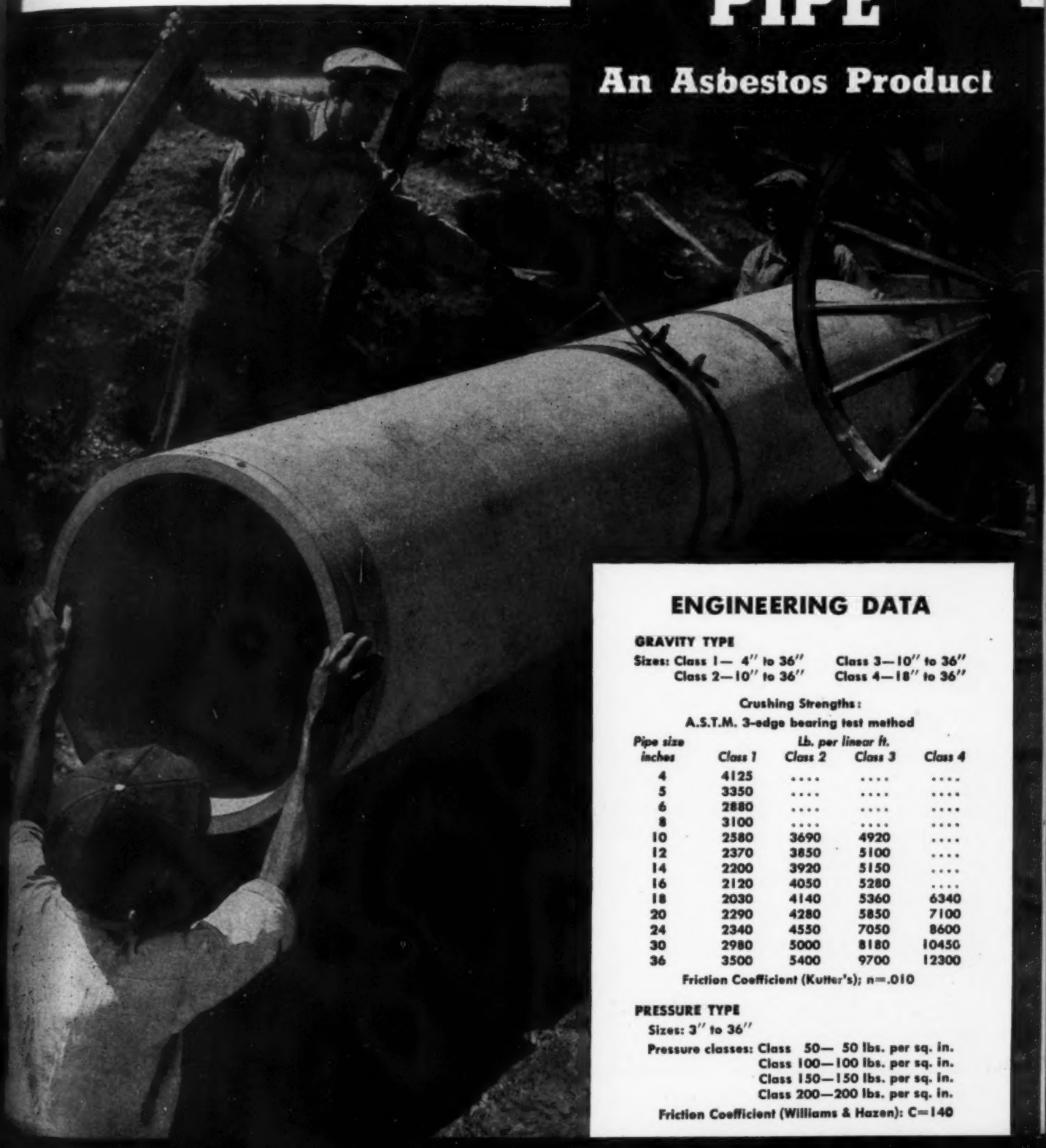

ENGINEERING DATA

GRAVITY TYPE

Sizes: Class 1— 4" to 36" Class 3—10" to 36"
Class 2—10" to 36" Class 4—18" to 36"

Crushing Strengths:

A.S.T.M. 3-edge bearing test method

Pipe size inches	*Lb. per linear ft.* Class 1	Class 2	Class 3	Class 4
4	4125	....	....	....
5	3350	....	....	....
6	2880	....	....	....
8	3100	....	....	....
10	2580	3690	4920	....
12	2370	3850	5100	....
14	2200	3920	5150	....
16	2120	4050	5280	....
18	2030	4140	5360	6340
20	2290	4280	5850	7100
24	2340	4550	7050	8600
30	2980	5000	8180	10450
36	3500	5400	9700	12300

Friction Coefficient (Kutter's); n=.010

PRESSURE TYPE

Sizes: 3" to 36"

Pressure classes: Class 50— 50 lbs. per sq. in.
Class 100—100 lbs. per sq. in.
Class 150—150 lbs. per sq. in.
Class 200—200 lbs. per sq. in.

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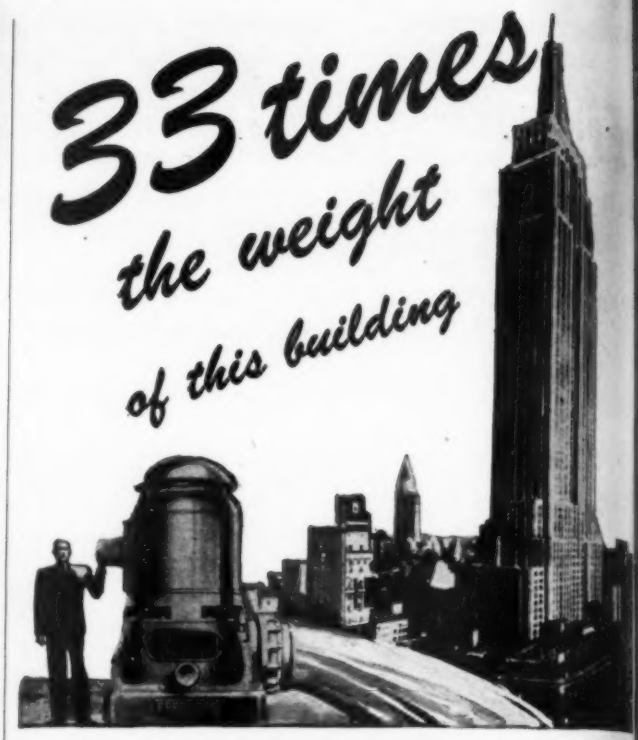

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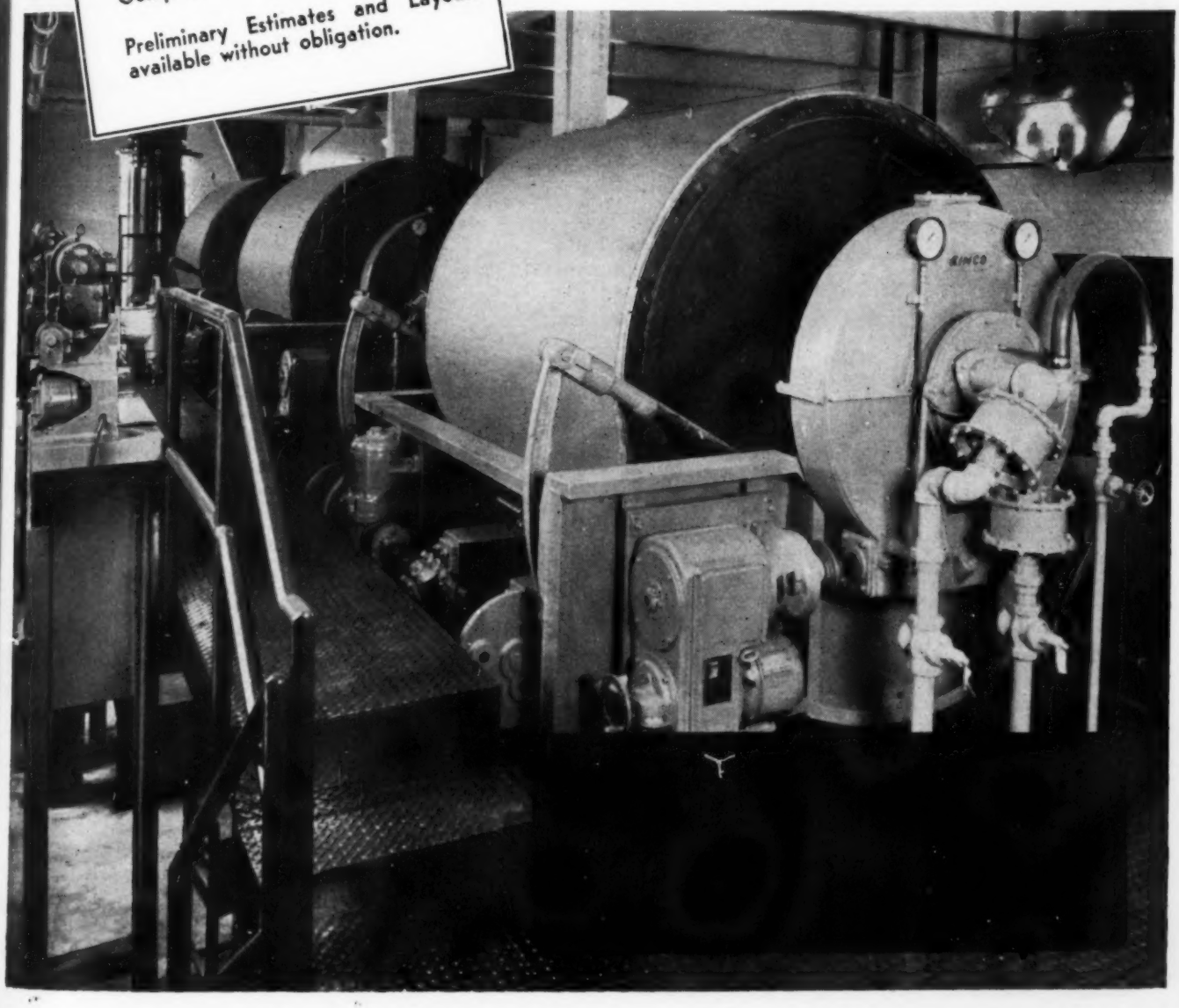
A 63



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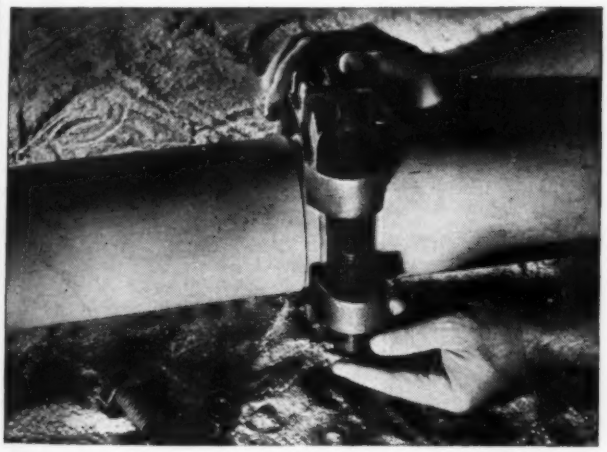
3 Slide gasket into central position over pipe ends. (You're working up to a leak-tight, self-sealing joint . . . for either pressure or vacuum.)



4 Put on housings and insert bolts. You'll be surprised how little time you've taken until now.

5 Turn down the nuts until housings come together. That's all there is! And at each joint you have flexibility, expansion, a union, and a sure, safe lock . . . faster than you'd have thought possible!

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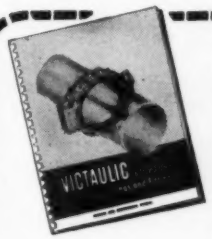

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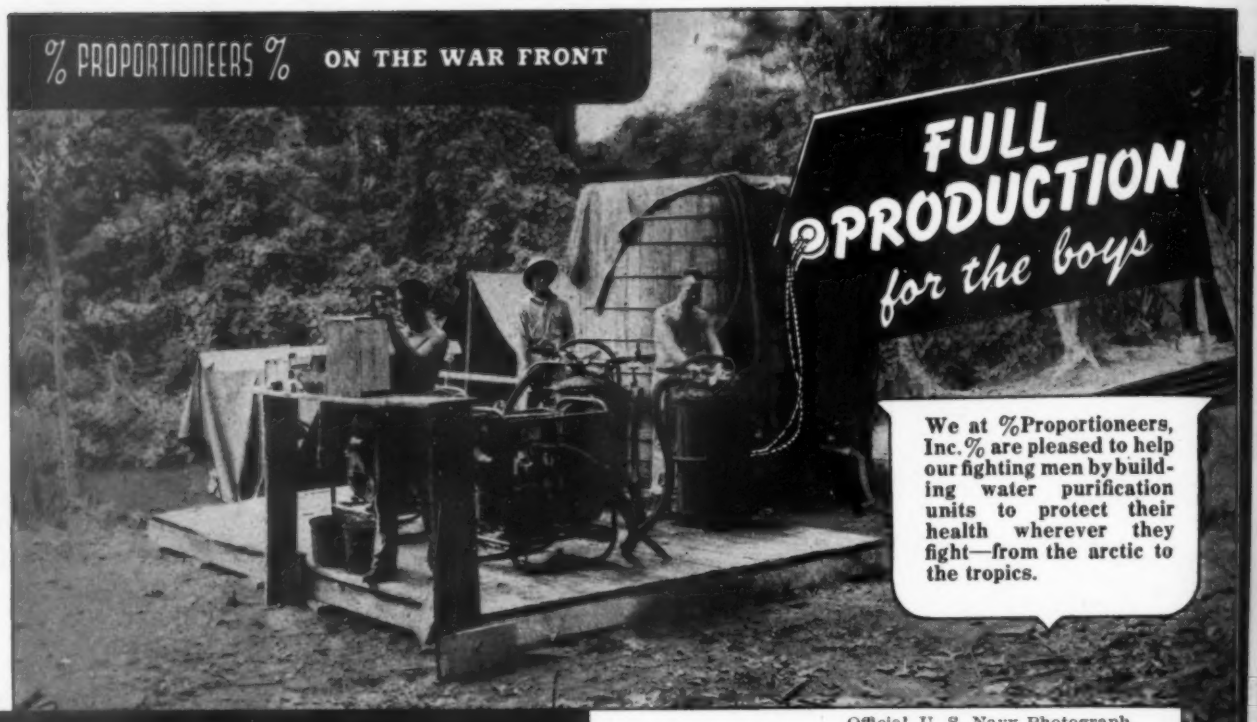

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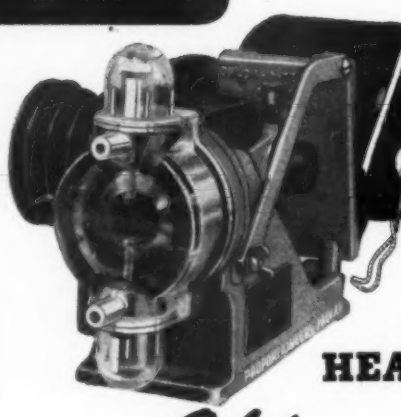

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WATER WORKS & SEWERAGE

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155 East 44th Street, New York, N. Y
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COMING!

Distribution Studies

Charts for determining equivalent pipes and loop flow distribution have been developed to furnish a quick and easy method of computing these sought for values in utilizing the Hardy Cross method for determination of flows in networks. Extending the simplification of the Hardy Cross method as presented by D. R. Taylor, in the June, 1943, issue of "Water Works and Sewerage," this article shows how these charts may be applied to the examples given in Mr. Taylor's article as well as to other problems.

H. W. CLARK, City Engineer,
Niagara Falls, N. Y.

"Accounted-for Water and Unbilled Revenue"

Describes a scheme developed for the purpose of estimating with fair accuracy the accounted-for and unaccounted-for water and unbilled revenue at any desired time, without up-to-the-minute reading of the meters. Currently the idea is of interest and usefulness because of the prevalent practice of skip month reading and rendering of estimated interim bills to customers. In short, the procedure makes possible a close estimate of the unseen registration of individual meters at any time between actual readings. The contributor, a long experienced water works man, is—

CHAS. E. MOORE,
Manager, Roanoke (Va.) Water Dept.

Organizing and Financing Sewerage Districts

Is an account of experiences and methods used in developing some of the most important sanitary districts in this country and methods of financing construction and operation by these political subdivisions independently of the municipality, or municipalities, served. The author, who has seen this development from its earliest beginning, is—

M. W. LOVING, Exec. Secy.,
Am. Concrete Pipe Assn., Chicago.

Modernizing Meter Rates

Is a discussion of rate making to produce an equitable charge for the service by the water utility, making a distinction between industrial water and domestic service based on sound economics and demonstrated costs of production, pumping and transportation. The author, who has made a thorough going study of this topic, is—

CHAS. H. CAPEN, Chief Engr.,
North Jersey Water Supply Commission.

"Problems in Sludge Handling"

Is a title which needs little interpretation for many of our readers. How such problems have been alleviated, if not completely solved, is told by an author who has had his share of such problems and working out their solution. He is—

CHAS. R. VELZY,
Greeley and Hansen Engrs., New York.
(Formerly a Plant Superintendent)

"Rejuvenating Rock Wells"

Is an account of the successful application of basically the same methods employed in the development or rejuvenation of sand and gravel wells to rock wall wells. In all instances when the method has been applied the result has been a gratifying increase in yields from these rock wells. The author, who is co-chairman of A.W.W.A.'s Committee on Deep Wells and Deep Well Pumps, is—

J. ARTHUR CARR,
Supt. of Water, Ridgewood, N. J.

Cleaning a Water Main with Compressed Air

Is a brief story telling of the usefulness of compressed air injected into a long force main, while pumping at maximum rate, as a means of breaking loose and flushing out a form of encrustation which gradually builds up to markedly reduce the main capacity and increase pumping costs. The article explains how simple and fool-proof this effective remedy is. The same article also reveals the effectiveness and economy of well desanding with compressed air. This story comes from—

ROSCOE R. HOWARD,
Supt. of Utilities, Slater, Mo.

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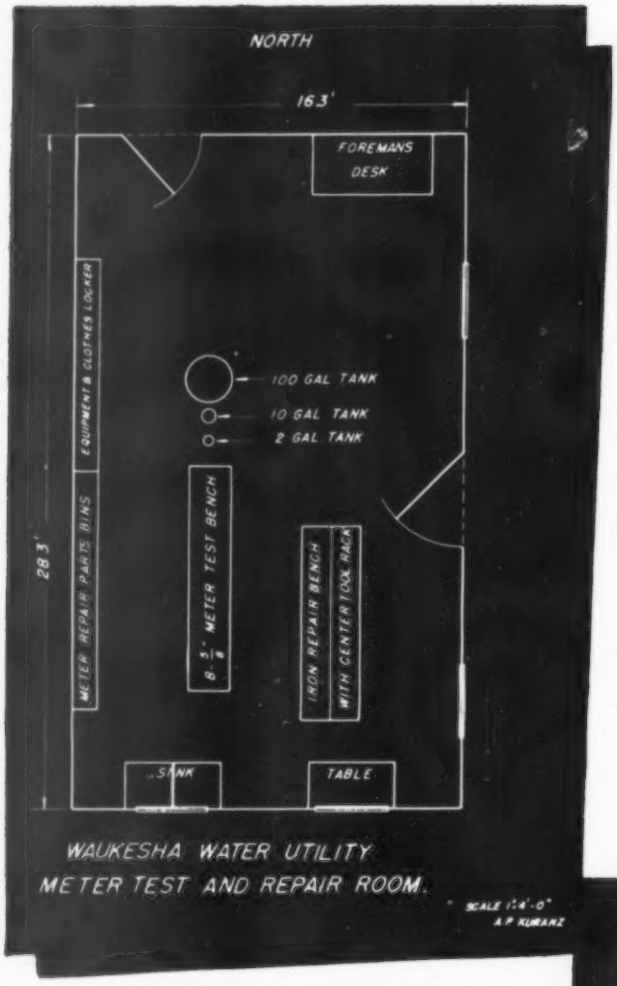
Increased Revenue



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Blueprint NOW

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WATER WORKS & SEWERAGE

VOL. 91. No. 7 *A Gillette Publication* JULY, 1944

EMPLOYEE ORGANIZATION IN THE PROFESSIONAL FIELD AND THE PUBLIC SERVICES*

By A. M. RAWN
Chief Engineer and General Manager
SANITATION DISTRICTS OF
LOS ANGELES COUNTY
LOS ANGELES, CALIFORNIA

(President of the Federation of Sewage Works Association)

"A.M."
Editorial Associate "Water Works and Sewerage"

FOR a number of years an interest in the economic welfare of the professional employee has inspired me to examine into his relative value to, and reward from society, as well as to inquire as to what extent his professional characteristics may influence him to disregard pertinent social changes in his environment. In common with many others I have felt some anxiety about the success with which the professional man, essentially an individualist, might breast the current of events alone or where he might wind up if he let others, strong and united, act for him. To a material extent the examination has also led in the direction of that individual known by the inclusive term, "white collar" employee, as well as toward the public employee. It takes a pretty broad picture of the whole background of employment to begin to comprehend why the professional and white collar employees more often than not have remained economically static, while those who work in the trades and crafts, as well as those who labor, forge ahead financially in a manner which leaves the brethren of the pencil, pen and slide-rule in a state of bewilderment and some envy.

Now I know that I cannot completely clarify this issue for you. I find it impossible to do so for myself. It is a confusing picture, lacking in proper perspective, constantly changing, both as to the canvas and the painters; but through all the welter of confusion appear to run certain threads of cause and effect from which some conclusions may be drawn and which incline one to the belief that, with care and understanding, a better relative balance is obtainable.

In order to develop what I believe to be important factors in this matter, it is necessary to go back a ways and as accurately as possible, though somewhat sketchily, narrate some influences which bear upon the present situation. Some of my data will be faintly statistical, some hearsay or what I have read in other writings and some just my own observation and thinking. When finished, I hope not only to have stimulated your interest in your mutual economic welfare but also to have convinced you to some degree that the increasing strength of, and deference to, labor are steps natural to the sequence of events accompanying a growing national intelligence and unity; and that the somewhat astonishing disparity between values placed upon labor, crafts and trades on the one hand and professional or white collar work on the other, is, to a considerable degree, the result of an apathetic attitude toward their members' economic welfare by organizations composed of professional men and white collar workers or their indifference to, or lack of familiarity with, the opportunities presented to them. Perhaps you may also discern the thought that while organized labor may be forced into a more responsible position, it will still continue to flourish and expand its influence and is a potent factor to be reckoned with in consideration of the future.

When the first employee went to work for the first employer, a degree of mutual dependence must have been recognized. The employee's dependence was probably by far the greater because, while the employer needed him to facilitate the production of goods and services in anticipation of profits, the employee needed the employer in order to buy the everyday necessities with which to live. The employer might select any one of many individuals. Carried to its conclusion, this reasoning leads one to the understanding that employees need employers more urgently than the reverse and therefore, in the ordinary course of events, the employer has by far the greater bargaining power. For years it was unlawful for employees to disturb this relationship by organizing or by group action.

*An address delivered by Mr. Rawn before the 64th Annual Conference of the Am. Water Works Association in Milwaukee, Wis., June 14, 1944. Reproduced by permission of the Association.

A Look Back at the Past

My early employment as an engineer took me into a wide variety of construction camps and permitted me in the early 1900's to observe labor under many different conditions. Although not aware at the time that what I was observing had much to do with employer-employee relations, I now realize that it was a most important factor, and that the change which has taken place in the economic welfare of the laborer or craftsman is as much due to the change in character and intelligence of the laborer as to any other factor. I can recall construction camps in which the racial division between laboring gangs was as sharply divided as are the nationals of Europe. Entire gangs would have been recruited for the particular job in local areas of Austria, the Slavic countries, Italy, Germany, Russia, Poland and elsewhere; and, in some of the construction camps, as many as three of four different groups of European nationals totally unable to speak English or to comprehend the language of the other gangs, would be working on various jobs in separated groups. There was no more unity of thought among them, no more mutual confidence, no more comprehension of one another's thoughts and ideas, than there appears to be among European countries today. They were foreign to the land in which they were working and each completely foreign to his neighbors.

Small wonder that these gangs of men looked each to an individual to take care of them and had no thought of pooling resources with their neighbors. They knew little if anything about America or American ideals, business, construction methods, privileges, schools or anything else. They had been attracted by wages which seemed to them extraordinary in their own countries but which turned out to be moderate in their new environment. Tens of thousands stayed permanently in the United States. Immigration was at its peak and the common labor class of America was composed to a material extent of negroes and European nationals, the latter entirely unacquainted with their new surroundings and with one another.

In the midwestern city in which I lived during the early part of the century, an area vaguely described as "the better part of the city" was occupied by native-born Americans mostly with comparatively short Anglo-Saxon names. There were, however, about a dozen other communities within the corporate limits, each occupied by European immigrants, as totally different from one another as are European countries. Each had brought the customs of the old world to the new, transplanted them to America, and each immigrant settlement mirrored strongly the mother country of its inhabitants. These foreign quarters furnished most of the labor.

Labor Organizations Come Into Being

The sons and daughters of these immigrants, receiving common school education and absorbing some of the intangible and unmeasurable benefits of life in this country, began to discard the customs and habits of their fathers. Some of them went to universities. Immigration laws changed drastically, curtailing the flow of new settlers to America and no longer was there a vast horde of central Europeans annually pouring into the United States to supply the labor market. As the elders reached and passed the age of usefulness, there were none of their temperament or disposition to supplant them; the youngsters were learning or had learned how to narrow the gap between themselves and the better-informed classes and began thinking of something beside the paternalistic employer-employee relationship which had theretofore existed. Increasingly familiar with American laws and customs, and having a feeling of being part of the country, they began to desire a greater interest in the employer-employee partnership and to understand how to go about acquiring it by collective action. In this pursuit they were aided and encouraged by the A. F. of L., organized in 1881, and to some extent by independent unions and the I. W. W.

With the advent of education, even a very limited education, an understanding of a common language, and an awareness of the advantages of the land and its customs, there ensued first less misunderstanding among those who labor and later, by degrees, mutual trust and cooperation. At first only the most intelligent of the skilled craftsmen and mechanics organized for their mutual advantage, to be followed from time to time by other crafts and trades and, finally, with the enactment of recent federal laws, practically all who work as employees are entitled, encouraged and helped by federal agencies to organize for collective bargaining.

I have purposely refrained from any discussions of the older craft and guild organization of the last two or three centuries. All were in part aimed at the same result: the protection of the craftsman in his job by restricting the number of available craftsmen, by perfecting workmanship, refusing to cooperate with unskilled workers, etc., etc. Organized labor, crafts and guilds enjoyed privileges and oportunities in Europe and portions of the British Empire long before they were organized here. I revert here to my statement that expansion of organized labor in this industrial country was a corrollary of progress toward national unity of speech, customs and ideals.

Although many craft and trade unions existed in the land at and prior to the turn of the century, effective federal recognition of labor began in about 1903 with the establishment of a cabinet post of commerce and labor. Around 1913 the United States Conciliation Service was formed in order to facilitate employer-employee relations. The Railway Labor Act which gave railway workers (one of the most closely knit crafts in the United States) the right to organize without interference or coercion, was enacted in 1926, to be followed fairly closely by the Norris-Laguardia Anti-Injunction Act allowing workers in wider fields to organize. The A. F. of L. is a pretty old organization; established in 1881, in 1905 it had a membership of 2,000,000±, and it is worthy of note that the A. F. of L. was inclined to organize by crafts and trades and that the heterogeneous union was not a part of its scheme of things. To me, this implies that it was formed with the thought that cooperation and mutual trust were not yet characteristics of all labor, but rather of groups, each with a well-defined community of interest.

Collective Bargaining Fostered by Federal Law

The National Industrial Recovery Act of 1933 broadened still further the field of labor organization and permitted labor to organize and bargain collectively without employer interference; while the National Labor Relations Act (N.L.R.A.) of 1935, known as the Wagner Act, not only grants employees the right to bargain collectively, but sets up legal machinery to assist them in doing so. Supplementing the N.L.R.A., the Fair Labor Standards Act was passed in 1938, prescribing minimum wages and maximum hours of employment. The National War Labor Board,

established to serve, as its name implies, during the present emergency, does not have jurisdiction over industries not connected with the war effort but does have as its objective the settlement of employer-employee differences and stabilization of wages in war industries in both inter- and intra-State commerce. Its powers are very great.

With the exception of individuals employed as agricultural laborers, domestic servants or those employed by parent or spouse, employees in interstate commerce are now granted the right to organize and bargain collectively. Fourteen million workers in America have taken advantage of the opportunity, and today organized labor constitutes one of the strongest forces in our national life. Well out of its swaddling clothes, it is, in fact, such a sturdy giant as to occupy one of the important places in our national councils. One cannot logically anticipate that it will do other than eventually reach maturity with a full consciousness of its responsibilities and with its privileges and opportunities extended to all who are employed.

In the minds of many, organized labor and collective bargaining are synonymous with strikes, violence, the closed shop and the New Deal. With the country's tremendous industrial upsurge and enormous increase in union activity in the past quarter century, this is not an unusual deduction; but actually the first federal intervention and national interest was aroused by a strike of the United Mine Workers in 1902 for the settlement of which President Theodore Roosevelt appointed an arbitration committee which resolved the difficulty by awarding shorter hours and better working conditions generally to the miners. Every legislative enactment of the federal government on behalf of organized labor since that time, has had as its stated or implied objective the elimination of strikes, work stoppages and lockouts. The last and most liberal of all (the National Labor Relations Act) sets out in the preamble (Section 1) the following general reasons for the law:

Language of the N.L.R.A.

"The denial by employers of the right of employees to organize, and the refusal by employers to accept the procedure of collective bargaining lead to strikes and other forms of industrial strife or unrest. . . .

"The inequality of bargaining power between employees who do not possess full freedom of association or actual liberty of contract . . . substantially burdens and affects the flow of commerce. . . .

"Experience has proved that protection by law of the right of employees to organize and bargain collectively safeguards commerce from injury, impairment or interruption . . . by encouraging practices fundamental to friendly adjustment of industrial disputes arising out of wages, hours and other working conditions and by restoring equality of bargaining power between employers and employees.

"It is hereby declared to be the policy of the United States to eliminate the causes of certain substantial obstructions to the free flow of commerce . . . by encouraging the practice and procedure of collective bargaining and by protecting the exercise by workers of full freedom of association, self-organization and designation of representatives of their own choosing for the purpose of negotiating the terms and conditions of their employment or other mutual aid or protection. . . ."

Whether one agrees with the motives expressed or not, it must be admitted that difficulties between labor and management cannot all be attributed to the panacea of federal labor legislation which has been offered as a means of curing such difficulties. Neither labor unions nor labor legislation are innovations, although in the past 12 years, labor has gained great advantages in the expansion and extension of the privileges and assistance offered it by the federal and some State governments. I restate that it, and those who labor, have arrived at a point in the nation's progress today where there is little if any hope of subtracting from these rights and privileges. It is reasonably clear that the curve of progress and privileges for labor will continue upward, coupled perhaps with a demand from labor for greater recognition of the responsibilities which such a position as it now holds in national affairs, implies.

What Is the Position of the Professional Employer?

National progress in this democratic country cannot help but result in a more and more enlightened manual trades and labor which in its turn certainly implies a stronger and more responsible laboring class. What is the position of the professional; the white collar and public employee in this great social transformation?

The professional employee desires above all things to have his professional status recognized as his strongest community of interest with his fellows. He desires that negotiations relating to his wages, hours of work and conditions of employment be made either between himself and his employer or between representatives of his own collective choosing and his employer; and that those who represent him share in his "community of interest," understand his principles and ideals and, in effect, have the professional point of view. Individually and collectively he is opposed to having his bargaining rights assumed by non-professionals and matters relating to his wages, hours and working conditions settled with his boss by them.

For a number of years labor unions made no effort to organize professional employees. However, in 1933, the C. I. O. organized a union known as the Federation of Architects, Engineers, Chemists and Technicians (F.A.E.C.T.) and about the same time the A. F. of L. grouped a parallel union known as the International Federation of Technical Engineers, Architects and Draftsmen's Unions (I.F.T.E.A. & D.U.) These two, with current membership about 10,000 each, are generally sub-professional in character, although both have many professional members and neither is averse to including on its membership rolls all of the professionals it can garner below the status of employer. Professional men, particularly chemists and engineers, have had to call upon the resources of their technical organizations to prove that they were professionals and that as such they had a "community of interest" not common to non-professionals and were therefore entitled to be excluded from heterogeneous bargaining groups designed to include both those of professional and non-professional status.

He Must Study and Understand His Legal Rights

The mere being able to stay out of the heterogeneous bargaining group is not enough to prevent the representatives thereof from assuming the bargaining rights of the professional employee in an office which has been organized; neither is it enough to permit him adequate representation to his employer upon wages, hours and working conditions. To fully pro-

tect himself from domination by non-professionals, he must not only insist that he be excluded from trades and labor organizations, but if necessary must be prepared to organize and bargain collectively in his own behalf. A clear understanding of his rights and privileges under the law is a necessary prerequisite to any activity in this respect. The law does provide for him and all of the advantages extended to any other employee are his if he desires to avail himself of them. The nature of his work and the inherent individualism which is so strong a characteristic of the professional man has many times restrained him from seeking such advantage as the law offers—at times to his great disadvantage.

His reticence is entirely understandable. He is not a laborer in the sense of doing manual work or indulging in the trades and crafts. His work is essentially scientific and learned, and until he found, to his surprise, that his professional relations with his employer were being settled by representatives of the trades and labor groups, he took comparatively little interest in what legal privileges he was entitled to. His indifference to his own plight probably accounts in large measure for the value which society places upon his efforts. Concerted collective action by trade and labor unions has forced employers to narrow almost to the vanishing point, the financial gap between the laborer and sub-professional on one hand and the professional on the other.

The future, which in all probability will see the privileges and power of labor expanded, must be viewed by the professional employee in a practical manner. He must become familiar with the laws regulating employees and employment and must be prepared to assume for himself, individually or collectively, all of the rights and privileges which the law extends to employees.

And, What of the White Collar Worker?

The white collar workers described by Senator Thomas of Utah as the twenty million forgotten Americans, have been practically lost in the progress that labor has made. Only recently the two major labor organizations of the country have intensified their efforts to organize office workers. Where inequalities in compensation exist, their arguments detailing the economic values to be gained from organization will fall on fertile soil and there isn't much doubt but that they will succeed in recruiting tens of thousands of office employees. Where office employees find their employment conditions congenial and have no reason for changing them, the effort may not meet with very much success. My personal opinion is that as labor develops a greater consciousness of its obligations and responsibilities, its alliance with the white collar group will become stronger and collective bargaining will be more and more extended to that particular stratum in the employee class.

The Position and Future of the Public Employee

About public employees: the National Labor Relations Act states that "The term 'employee' shall include any employee . . . but shall not include any individual employed as an agricultural laborer or in the domestic service of any family or person at his home or any individual employed by his parent or spouse." This would appear to permit the organization of collective bargaining units by any employees excepting those specifically mentioned, and would not exclude employees of the United States or any State or political subdivision thereof. In the same Act, however, it is stated "The term 'employer' includes any person acting in the interest of an employer directly or indirectly, but shall not include the United States or any State or political subdivision thereof. . . ." Thus it would appear that while employees of the United States, or any State or political subdivision thereof, have the right to organize and bargain collectively, they cannot invoke the law to force their "employers" to adjust inequities or change wages, hours or working conditions.

Public employees have no standing before the Wage and Hour division of the Department of Labor, because in that Act the definition of an employer is as follows:

"Employer includes any person acting directly or indirectly in the interest of an employer in relation to an employee, but shall not include the United States or any State or political subdivision of a State. . . ." An employee is defined as "any individual employed by an employer." Thus it appears that while employees of the United States or a State or any political subdivision thereof have the right to organize and bargain collectively, their employer, not recognized as such by the National Labor Relations Act, is not bound by the law to bargain with them. Further, it is apparent that the public employee has no recourse to the Wages and Hours Act. Thus while the right to bargain collectively is not denied him, the right to compel his "employer" to do certain things which other employers must do, is.

Bargaining vs. Striking by Public Employees

In effect, this means that public employees can join together for collective bargaining purposes and bargain with their employer but they cannot take a dispute for settlement before the National Labor Relations Board or the National War Labor Board. I need hardly make the statement about organizing because you are all well aware that literally thousands of public employees in the United States are already organized for collective bargaining purposes.

The right of public employees to strike is an interesting speculation about which much has been written. Three well-qualified authorities have answered the question "Have public employees the right to strike?" by stating respectively, "Yes," "No," and "Maybe." It has been stated as fundamental that because government does not function for private profit, public employees are not exploited. The first of these authorities, the one who answered "Yes" to the question posed in this paragraph, says this is not so because government under pressure of economy, produces the same effect in low wages as does private employment, and that therefore public employees often are exploited and need all the benefits of collective bargaining. He continues that in striking, the action is not against the State or government as such, that it has no political motivation, but is aimed at politicians or administrators and is thus exactly like a strike in private industry. He cites a Columbia University study of over 1000 strikes in the public services in which no single action pointed to the contrary.

The individual who states that public employees do not have the right to strike, says in effect that no employee has the right to interfere with the orderly conduct of public affairs without the people's consent; that the right to do so should be regarded in the same terms as the privilege granted individuals by the people to sue the State; and, that not until the people recognize by law the right of public employees to refuse to obey their superior officers under specified

circumstances, and strike against the actions of public officials, is there any right of public employees to strike.

The third writer says "Maybe"—and relates that denying the public employee the right to strike is based upon the theory that government, as custodian of final authority in the land, cannot permit those whom it hires to carry on its work, to challenge its authority. He continues that federal employees are not forbidden to strike and says that when the State denies its workers the right to strike merely because they are government employees, it defines common labor disputes as attacks upon public authority and makes the use of drastic disciplines and armed force a method of handling otherwise simple industrial relations. This writer continues, in effect, that a free labor movement among the millions of public employees is their only effective check upon the greatly enhanced power which expanding governmental activity gives to public authority.

You may subscribe to any one of these views, or any other which bests suits your own reasoning. I have cited them to illustrate to you that the country has not as yet found the answer to public employees' difficulties nor has there been prescribed a rational employer-employee relation in such service. Public employees do organize and, upon occasion, they strike; and, it is yet to be determined whether they have the legal right to do so.

Looking the Question Squarely in the Face

My limited experience* indicates to me that in order to judge of this whole affair with any reasonable degree of accuracy, one must approach it with an entirely open mind and admit that he is confronted wtih facts and not theories. Collective bargaining as manifested by labor union activity, is one of the strongest and most potent forces in this nation today and, in view of the experience which has been gained in the last two or three centuries and particularly in the intensified industrial era represented by this, the Twentieth Century, it is bound to be strong in any democratic form of government. Concessions from a powerful group to a less powerful one are seldom if ever voluntary; and, the recognition of labor by capital as an influential and, at times, controlling partner in industry, is no exception. Labor has forced capital into its present position and democracy, operating as it does in this republic, appears to be bent upon protecting the privileges which labor has gained. If the curve of events which has marked the evolution of collective bargaining here during the past forty years is any indication of what is to take place in the future, one can look forward to the privileges of collective bargaining, and the help and encouragement to bargain collectively, being extended in some form or another to all employees in the entire country not many years hence; and, those who operate public enterprises may, within the next short time, feel the pressure of labor brought to bear upon their methods and practices with full legal sanction.

Whether you like it or not, those are things with which you who manage, administer or direct the public utilities or services are confronted. I earnestly recommend that you keep alert to the situation and that, if you have not already done so, you organize in committee to keep yourselves fully and adequately informed of the trend of labor activity in the municipal and public service field, and at all times be entirely aware of the rights and privileges acorded to both employer and employee; and, with respect to the latter, include the professional and white collar employees as well as trades and crafts.

*Ed. Note: The author as Chairman of the Committee on Employment Conditions of the Am. Soc. of Civil Engineers has made a painstaking study of this subject and consequently was the best grounded man available to present his reasoning and viewpoints before the A.W.W.A.

WPB Order P-141 Revised

Preference Rating Order P-141, governing maintenance, repair, and operating supplies of public sanitary sewerage facilities was amended on June 21st to ease restrictions imposed thereby. The order now permits above ground additions up to $1500 as shown in the following amended section:

"(6) Operating supplies means:

"(ii) Material for an addition to or an expansion of sewerage system or works, other than buildings, provided that such an addition or expansion shall not include any work order, job or project, in which the cost of material shall exceed $1,500 and provided that no single construction project shall be subdivided into parts in order to come below these limits."

Certain restrictions on the use of aluminum have been removed, as shown by this amendment.

"(c) *Controlled materials; steel, copper and aluminum.* Subject to the quantity restrictions contained in paragraph (f) of this order, any operator requiring delivery of any controlled material for maintenance, repair or operating supplies may obtain the same by placing on his delivery order the certification required in paragraph (e) (1) hereof. An order bearing such certification shall constitute an authorized controlled material order."

Also revised is section 2 of division "(d) Restrictions on use of symbol and ratings."

"(2) The preference ratings assigned by paragraph (b) shall not be used to obtain any item included in Lists A or B of Priorities Regulation No. 3."

Other revisions include that of section (1) in division "(g) Restriction on construction of sewerage facilities" and on sub-section (i) in section (2) of the same division (g)—

"(1) An operator may construct an addition to or an expansion of, sewerage system or works, other than buildings: *Provided,* That such addition or expansion shall not include any work order, job or project in which the cost of material shall exceed $1,500: *And provided,* That no single construction project shall be subdivided into parts in order to come below these limits: *And further provided,* That in making house connections or extension of line to serve premises, no iron or steel pipe shall be used except the minimum quantities required in making necessary connections."

"(2) (i) The cost of material for such extension does not exceed $5,000 but exceeds $1,500."

Throughout section "(3) Exceptions" of division "(f) Restrictions on deliveries, inventory and withdrawal," the value is now $5000 not $1000 as in the order of Jan. 5. This means that " an operator who during 1942 did not use more than $5000 worth of materials may now use up to" that amount "of the same without special authorization from the board." The previous limit had been $1000.

Thorndike Saville Honored

Dean Thorndike Saville, of the New York University, College of Engineering, who was honored this past spring by receiving the degree of Doctor of Engineering from Clarkson College of Technology, was honored again recently, when he received an Award from the Army Air Forces Training Command for Excellence of Meteorology Training. Dean Saville spoke at the graduating exercises of men in the Meteorological Training Course at New York University.

CEMENT LINING OLD MAINS IN PLACE PAYS

Some Comments Based on Results from 1940 and 1942 Lining Projects of the West Palm Beach Water Co.

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Superintendent
WEST PALM BEACH WATER CO.
WEST PALM BEACH, FLA.

PALM BEACH and West Palm Beach, lying on opposite sides of Lake Worth in Florida, are served by one system, utilizing an excellent surface supply. This water is quite soft and at times highly colored and is presently treated primarily for color removal in a filter plant (see cover picture) placed in operation in 1927, replacing an older plant. The first filter plant was installed in 1920, and prior to that time untreated lake water had been supplied since 1894.

The early untreated water was highly corrosive and this condition was only partially corrected in the earlier years of treatment. In later years, more advanced methods had produced a more satisfactory water, but it could not be said that corrosion had been completely eliminated by the various corrective treatments applied.

In 1939 the distribution system of the two municipalities contained 106 miles of 4″ to 30″ cast-iron pipe, 29.5 miles of which was unlined cast-iron pipe installed prior to 1924. All other cast-iron pipe laid since 1924 has been cement lined.

For several years prior to 1939, the deterioration in the unlined mains was becoming increasingly evident in the nature of reduced carrying capacity, red water and at times taste and odor complaints.

In 1931 an 8″ main was cleaned with satisfactory results but seven years later the value of "C" had dropped to 70. On being then cleaned again tests showed a "C" value of 114. At the same time a second 8″ main was also cleaned with an increase in "C" from 62 to 133. This main had not previously been cleaned, which may explain the difference in results. While these operations did temporarily improve service in so far as the carrying capacity of these mains was concerned, the red water problem remained unsolved.

Decision to Cement Line With Tate Process

After investigating these problems, among others, Mr. Malcolm Pirnie,

The Author

Consulting Engineer for the West Palm Beach Water Co., recommended that the most troublesome mains be cleaned and cement lined in place by the Tate process, which then had only recently been introduced in this country.

At about this time the Town of Palm Beach planned an extensive program of repaving its principal thoroughfares and ordered all utilities to anticipate underground construction and maintenance in order to avoid as far as possible future damage to the new pavement. While this was not a controlling factor, the logic of coordinating a cement lining project with the Town's program was obvious, and in adopting the recommendation this principle was followed.

In 1940 a contract was awarded to Tate Pipe Linings, Inc., of Andover, Mass., for the lining of 5.8 miles of mains and this was followed in 1942 with an additional contract for another 5.5 miles.

The Tate lining process has been several times described in the literature and particularly in earlier issues of *Water Works and Sewerage* and, in consequence, will not be repeated here. In brief, it consists of thorough cleaning of the main and thereafter placing a charge of carefully hydrated and measured cement mortar therein, and pulling through a bullet-nosed mandrel. This mandrel squeezes the cement mortar against the walls of the pipe to produce a dense compressed lining, having a smooth and uniform bore. For details concerning the process and equipment, and materials involved, the reader is referred to the following two excellent articles. (1) "Lining Mains in Place With Cement Mortar" by Jas. E. Gibson, manager, Charleston, S. C. Water Dept., W. W. & S., May 1940. (2) "Rejuvenate With Victory Lining" by Roger W. Esty, Supt. of Water, Danvers, Mass., W. W. & S., June 1943.

The contracts were awarded under specifications prepared in Mr. Pirnie's office and the 1940 project was completed under the supervision of Mr. Alfred Sawyer as resident Engineer for Mr. Pirnie. In 1942, Mr. C. D. Hartman, the West Palm Beach Water Company's engineer handled the field work and inspection.

Unfortunately, it was not feasible to run tests for the value of "C" on all of the mains cleaned but the following results of tests on two mains are probably representative.

	Before Lining	After Lining
12″ Main	61.0	99.5
8″ Main	81.2	105.3

Results are based on nominal pipe size, rather than actual diameter of the pipe after lining.

The 8″ main on which this test was run in 1942, is the same one which showed a value for "C" of 133 after being cleaned in 1938. However, it seems preferable to start with a lower "C" value which can be maintained than to start higher and lose it.

Preparatory Work Reveals Unsuspected Conditions

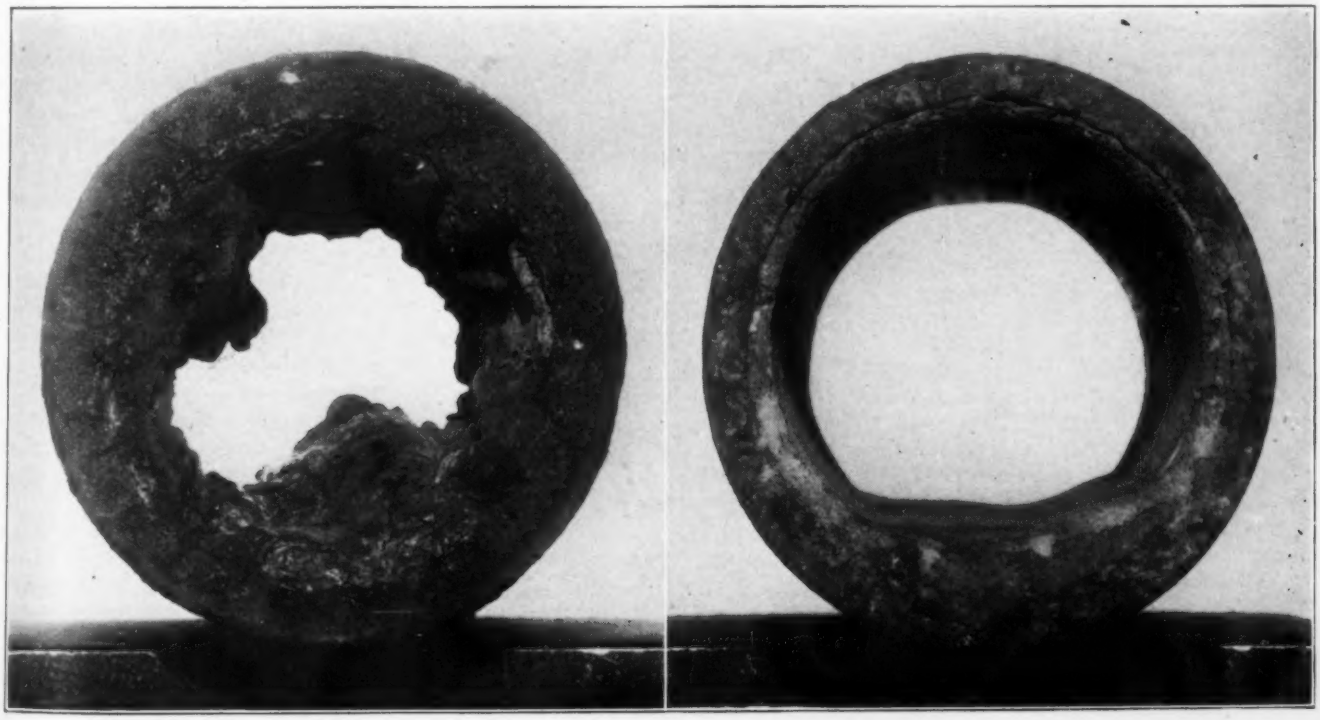
Before these contracts were awarded the mains involved were carefully investigated and all known fittings and valves listed and located. Care in this preliminary work pays worth while dividends in the saving of time, incidental expense, and service interruption. Nevertheless, in spite of the most painstaking care, many unsuspected fittings and valves were encountered, and the material yard became substantially augmented. The outstanding horrible example was the finding of three 12″ x 6″ crosses in

Palm Beach Booster Station of the West Palm Beach Water Co.

(Through the trees on right can be seen the masonry work of the 1 mg. reservoir behind this fully automatic booster station. It costs real money to pump water through such mains as are pictured with this article. On the front cover is a picture of the filtration plant located on the mainland.)

one intersection, with four six-inch bells plugged—the result of inadequate records during the early years of operation.

A somewhat interesting operating problem was involved in lining 4000 feet of an 8″ main which was not paralleled by any other main for that distance. This main carried a heavy load to a high class residential area and it was essential that service interruptions be held to a minimum. This was accomplished by using a 6″ temporary line, laid above ground, 600 to 800 feet long, which was sufficient to by-pass enough main for a day's work for the lining crew. Each day an additional length of by-pass



Two Sections of a Four Inch Main Before and After Cleaning and Lining by the Tate Process.

(The least diameter of the lined pipe is 3¼″ top to the flat bottom. Otherwise the diameter after lining is not less than 3⅜″. Minimum thickness of lining is ⅛″ to 3/16″.)

line was laid in advance in readiness for the next day's work. In this manner just two by-pass lines were required. Tie-ups and change-overs were made at night when service interruptions were permissible.

Cost Considerations

A cost analysis revealed that the cost of lining, including overheads and engineering was 39.7% of the book cost of the mains involved. This book cost did not include the cost of pavement over mains. As compared to the cost of replacement with cement lined cast-iron pipe, including the cost of replacing pavement, the cost of lining would probably be about 33% of the cost of complete replacement.

This ratio varies materially with size of pipe and number of fittings and valves. The ratio in the case of the 1940 program was 35% based on book costs, whereas in 1942 this ratio was 45%. This latter program included 50% of 4" and 6" pipe with many fittings, whereas the former consisted almost entirely of 8", 10" and 12" pipe.

There are varying views regarding the proper methods of accounting involved in work of this character, but it is this writer's opinion that a sound method is to charge against the depreciation reserve the differences between the cost of lining in place and the cost of factory lining. The factory lining cost will run about 10% of the cost of lining in place and should be charged to capital, as it represents increase in value.

The results of this work, which was initiated in 1940, are felt to be highly satisfactory. It is considered that the reconditioned mains are practically as good as new; and, while the coefficients developed are not quite as high as might be obtained from new cement lined pipe, they are sufficiently high and it is reasonable to believe that there will be little if any deterioration. Furthermore, because the new lining results in continuous tubes of from 300 to 400 feet in length, all but about 3% of the joints are sealed and a minimum of leakage is anticipated. On future work planned, it is hoped that some data in this connection can be developed. In any event, a study of leakage before and after lining is to be attempted.

"Bill" Hurst Promoted to Asst. City Engineer of Winnipeg

Wm. D. Hurst, who until recently has been Engineer of Water Works for Winnipeg, Canada, has been appointed Assistant City Engineer of Winnipeg—quite a boost for a man so young.

This promotion has more significance than would appear at first hand because "Bill" Hurst was made assistant to the present City Engineer, Wm. Aldridge, at a time when it is understood that Mr. Aldridge is shortly to retire and that the man appointed as his principal assistant would be logically the succeeding City Engineer.

Wm. D. Hurst

Mr. Hurst is a Canadian and graduate from Manitoba University 1930 after which he took graduate courses at the Virginia Polytechnic Inst., which led to the degree, Civil Engineer. He entered the employ of the Water Department of Winnipeg upon graduation and was made Engineer of Water Works in 1934, in itself a rapid stride for a young engineer three years out of college. After 10 years as Water Works Engineer he now becomes the logical successor to the post of City Engineer of one of Canada's major cities. We believe that he will hold the record as Canada's youngest City Engineer—certainly of such an important city, if not of all cities.

Mr. Hurst is an active member of A.W.W.A. and enjoys the distinction of being as welcome in the Minnesota Section as in the Canadian Section of A.W.W.A. Fact is, the Minnesota Section has elected him a Trustee; and, what's Minnesota's gain is Canada's loss.

"The Public Utility Goes to School"

Under the above title, Mr. E. J. Rowe, Supt. of Water and Light at Wellsville, N. Y., presented a paper at the 1943 fall meeting of the New York Section of AWWA. Mr. Rowe's paper told how during the course of several years the Water and Light Department had developed a series of lectures and demonstrations for presentation to grade and high school students of the village. These presentations are a part of the regular curriculum of the students and it has been found that a better understanding of the problems and operation of the Water Department have become noticeable not only among the students, but also among the parents and taxpayers of the village.

E. J. Rowe

(By the N. Y. Section, Mr. Rowe was voted the Fuller Award "for his pioneering leadership in stimulating group meetings of water works officials and his unstinting assistance to neighboring water works officials. . . . ").

The lectures contain a synopsis of the history of water, its characteristics and treatment for domestic and industrial purposes, together with a study of the Wellsville Water Department with notes, examples, questions and sketches. It was prepared expressly for the Wellsville High School by the employees of the Water and Light Department of Wellsville, N. Y., and is dedicated to "Better health and knowledge of civil government."

In the preface, the history of water supply and the development of water treatment are presented. This is followed by a chapter on the characteristics of water, why and how it is treated—all presented in plain, easily understandable language.

Chapters III and IV concern the history of the Water and Light Department in Wellsville.

Chapter V is a discussion of the control of water treatment, with particular emphasis on laboratory routine. Bacteriology is also lucidly discussed.

Frequently asked questions are presented and answered in various parts of the report.

Truly, this brochure is one which commands commendation for its lucid presentation of a vital service to a community.

AWWA IN MILWAUKEE

Where Depreciation, Wartime Practices, Plant Management and Post War Planning Occupied Spotlight and Attendance Record Topped All Expectations

WITH the official registration reaching 1,356 the Milwaukee Conference of the American Water Works Association, June 13-16, was better attended than anticipated by many—in fact the attendance was 225 better than that of the Cleveland Conference in 1943.

Presidents—AWWA.

(Retiring)	*(Incoming)*
Sam'l B. Morris	*Sam'l F. Newkirk*
Dean of Eng.	*Engr. & Supt.*
Stanford Univ.	*Water Comm.*
California	*Elizabeth, N. J.*

The Board of Directors chose St. Louis as the place for the 1945 Conference, with the proviso that in case satisfactory arrangements can be made. If not, New York City is the next choice for the 1945 Conference, and Pittsburgh is the third choice. However, all indications are that St. Louis will be the 1945 Conference City, in which event the dates will be moved up to avoid hot weather in St. Louis.

The Milwaukee Conference, considered one of the most successful of AWWA Conferences ran very smoothly. For this, high credit is due the Local Convention Committee under Chairmanship of Joseph P. Schwada, City Engineer, and the Local Host Committee under Herbert H. Brown, Supt. of Water.

Awards and Honors

At the close of the Annual Dinner, President Morris delivered the following awards and conferred Honorary Memberships on Chas. B. Burdick of Chicago, Frank E. Hale and Thos. E. Wiggin of New York.

The John M. Diven Medal, the highest award of the Association, was presented to Louis R. Howson, past-president of AWWA, in recognition of his many outstanding services to the Association.

The John M. Goodell Prize, which goes to the author, or authors, of the most meritorious paper appearing in the AWWA Journal during the year, was presented to Noel S. Chamberlin and John R. Glass, jointly, for their paper on the "Colorimetric Determination of Chlorine Residuals," which appeared in the August and Sept., 1943, issues of the Journal.

The George W. Fuller Awards, voted by the Sections, were presented to the following:

George W. Pracy (California).
Wm. Storrie (Canadian).
Frederick A. Eidsness (Florida).
L. L. Hedgepeth (Four States).
Winfred D. Gerber (Illinois).
Edw. F. Kinney (Indiana).
Louis B. Harrison (Michigan).
Dan H. Rupp (Mo. Valley).
David S. Thomas (Montana).

Dynamos

Harry Jordan	*"Bill" Orchard*
Exec. Secy.	*Chairman*
AWWA	*Conv. Mgmt. Comm.*

(Each well satisfied.)

Presidents—Mfrs. Assn.

(Incumbent)	*(Elect.*)*
Charlie McGinnis	*Charlie Becker*
Johns-Manville	*R. D. Wood Co.*
New York	*Philadelphia*

*(*Elected in Milwaukee to take office Dec. 1.)*

Attmore E. Griffin (New Jersey).
Ernest J. Rowe (New York).
Wm. M. Piatt (North Carolina).
Philip Burgess (Ohio).
Fred Merryfield (Pacific N.W.).
Dwight D. Gross (Rocky Mtn.).
Fletcher K. Ellis (Southeastern).
Leslie A. Jackson (Southwest).
Robt. C. Bardwell (Virginia).
John N. Chester (Western Pa.).
Joseph K. Buchanan (West. Va.).
Herbert H. Brown (Wisconsin).
Joseph P. Schwada (Wisconsin).

The Nicholas S. Hill Cup, which is awarded that Section showing the greatest member gain during the year, on the basis of potential members within the area covered by the Section, was won by the Florida Section. The Southwest Section was the runner-up and the Virginia Section was third in membership gain.

The Henshaw Cup, awarded that Section showing the largest attendance at its annual meeting of mem-

Festivities

Tuesday Night's Audience and Portions of the Show, and the Closing Annual Dinner. In Center, Malcolm Pirnie is Introducing Speakers Rawn, Falck (O.W.U.) and Col. Carey, U. S. Engrs., Guest Speakers at the Special Wednesday Evening Session.

Portions of the Exhibits Hall

From the left the booths pictured are those of Darling Valve, Graver Tank and Ford Meter Box Co. (Note: Snapshots of booths were limited to those with the highest illumination.)

bers as against guests and manufacturers' representatives, was won again by the Minnesota Section, which is believed to have won the Henshaw Cup more frequently than any other Section.

The Old Oaken Bucket went back to California, which continues to be the largest Section, with its 624 members.

Division Officers

The following were elected officers of the Three Divisions in the Association:

The Plant Management Division
Chairman—Herbert H. Brown.
Vice Chmn.—Lloyd A. Rebsamen.
Secy.—Sidney S. Anthony.
Director—M. P. Hatcher.
Director—Marcel Pequegnat.

The Finance and Acctg. Division
Chairman—Geo. B. Schunke.
Vice Chmn.—C. H. Lamb.
Secy.—Leslie A. Jackson.
Director—John L. Hawkins.
Director—Arthur P. Kuranz.

The Purification Division
Chairman—Geo. J. Turre.
Vice Chmn.—Cecil K. Calvert.
Secy.—Chas. R. Cox.
Director—Jas. E. Kerslake.
Director—Gordon M. Fair.
Director—A. C. Decker.

Evening Special Session a Feature

On the second evening of the Conference a Special Session was held in which the speakers were A. M. Rawn, Chief Engineer, Los Angeles County Sanitation Districts; Colonel W. M. Carey, U. S. Engrs., Chief Engr. Federal Works Agency, and Edward Falck, Director of War Utilities, WPB, Washington.

Mr. Rawn spoke on "Employee Organization in the Professional Field and The Public Services" His paper is printed in full in this issue. Colonel Carey discussed "Public Works in Post War Planning." Mr. Falck reviewed experiences and accomplishments of the Office of War Utilities, and the attention that had been given such an important utility as the water supply. He was most appreciative of the cooperation from

Vice-Presidents

(AWWA.)
Leonard Thompson
Genl. Supt.
Water Dept.
St. Paul, Minn.

(WSWMA.)
Everett Jones
Sales Mgr.
Simplex V. & Meter
Philadelphia

the water works field and promised that the mandatory redistribution of excess inventories would soon be lifted. He also saw ahead a substantial easing and increasing production of utility equipment within the year. Even now shortages had been materially reduced.

Later in the Conference, Arthur E. Gorman, speaking for the Water Division of the Office of War Utilities, told of the recent release of some bronze for meter casings, and that more copper tubing would become available if the war in Europe continued to go as well. Also steel can be had for water tanks if the importance of such justifies use of the steel plate.

Papers Before the General Sessions

Reported by Geo. E. Symons

Despite the absence of President Samuel B. Morris to preside at the first of three general sessions, AWWA proceeded with its scheduled program, under the able guidance of Sam F. Newkirk, Jr., Vice President. Dean Morris, who had been detained by floods in the west arrived in time, however, to preside at the Annual Dinner and closing sessions.

Aside from some complaints of heat in the assembly rooms of the Municipal Auditorium, compliments were the order of the day. Particularly pleasing were the general entertainment features, the exhibitors' halls, inspection trips to the water works, entertainments for the ladies, and the helpful solicitude of the local committee in handling the housing problem; but it was the technical sessions themselves which drew the crowds.

Cost of Water Works Structures

Keynoting the first general session, Charles B. Burdick (1914 Honorary Member) of Alvord, Burdick and Howson, Engrs., Chicago, introduced the subject of depreciation with his paper on "A Review of the Cost of Water Works Structures."

In making the review Mr. Burdick had adjusted all costs to the ENR base of 294 which existed in Sept. 1943 (now approximately 298). These

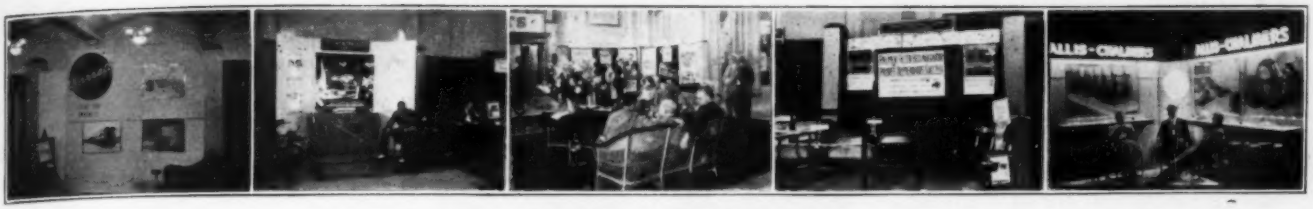
Gil. H. Corbin
Minneapolis Mgr.
and
L. L. Hedgepeth
Mgr. Tech. Service
Penna. Salt Co.
Philadelphia

Milo E. Smith
Chicago Br. & Iron Wks.
Chicago
and
Baxter F. Wade
Supt. of Water
Jackson, Miss.

D. R. Hiskey
Chemical Engr.
and
C. L. Armstrong
Field Engr.
Dearborn Chem. Co.
Chicago

Earl A. Smith
Badger-Meter Co.
Milwaukee
and
Ralph Hintz
Supt. of Water
Oshkosh, Wis.

Sid. Linderman
C. I. Pressure Pipe Inst.
Washington, D. C.
and
Thos. J. Skinker
Director of Utilities
St. Louis, Mo.



Portions of Exhibits Hall

From left the booths are those of (1) Barrett Co.—(2) Wallace & Tiernan—(3) Chain Belt—(4) Stuart-Brumley Corp.—(5) Allis-Chalmers. (Note: Snapshots of booths were limited to those with the highest illumination.)

indexes are based on costs of steel, lumber, cement, and labor and the index for 1913 was 100. A plot of these indexes indicates the steadiness of building costs from 1903 to 1913, a large increase in World War I to a maximum in 1920 followed by a depression in 1921, a peak of 200 in 1929 followed by a depression to 150 in the next few years. Since the depression the rise has been steady toward 300.

Allowing for adjustments of costs to the same base Mr. Burdick proceeded to show how the cost of various structures varied. Usually the larger the size of the structure, be it settling basin, or filter plant, the lower the unit cost. That is to say the cost of structures per million gallon capacity decreases as the capacity increases.

It was interesting to note that circular basins (coagulation or settling) were slightly lower in unit cost than rectangular basins, primarily because the yardage of concrete per million gallon capacity is less in circular tanks, whereas the amount of steel per yard of concrete is approximately the same.

Pumping station costs decrease per unit volume of the station, but this is per cubic foot of space, and is not necessarily related to the pumping capacity.

Survival and Retirement Experience of Structures

Speaking for the AWWA Committee on Survival and Retirement Experience of Water Works Structures, E. H. Aldrich, Cons. Engr. of New York, and Supervising Coordinator for the committee, presented the committee report.

In reviewing the history of the committee, its organization and mode of operation, Mr. Aldrich said that records had been collected on many facilities used and retired. For the purpose of study, two groups of items were set up. The first group included like items, such as mains, valves, meters, services, hydrants. The second group included items which depend largely on local conditions, such as dams, pumps, reservoirs, filters and so forth.

Hosts

(And their hard work showed for itself)

Jos. P. Schwada
City Engineer
Milwaukee

Herbert H. Brown
Supt. of Water
Milwaukee

Although the program of covering thirty-five cities is not complete (25 have been covered) the report is complete to date. Cooperation of utilities has been excellent and it is estimated that cooperating cities and companies have spent over $100,000 in working up the data. The report is a summary of facilities and retirement of items thereof. Mortality and survival curves are included in this valuable report.

Municipal Depreciation Accounting Practices

In the absence of N. T. Veatch, Cons. Engr., Kansas City, due to the death of F. M. Veatch's boy, killed in the line of duty in aerial combat, his paper on the above topic was read by his associate, E. L. Filby. Mr. Veatch's paper pointed out that at the last year's meeting of the Finance and Accounting Div. in Cleveland, there was considerable discussion of the lack of any standard practice in depreciation accounting.

As a result a questionnaire was sent out to 245 cities, of which 145 replied. Good geographic distribution of the questionnaires was made and it was felt that the replies might be taken as indicative.

Answers to the questions given by the 145 included the following: 107 make an annual depreciation charge . . . 70 of the 107 calculate the charge by applying an annual rate to book accounts for various types of equipment while 37 varied. . . . Classes of property include buildings, dams, wells, pumps, mains, valves, services, meters, hydrants, etc., and the depreciation rate varies widely, being lowest for dams and highest for transportation equipment, and averaging approximately 5 per cent. These data are of course influenced by the practice in the larger cities. . . . 77 of the 107 set aside 1.77 per cent of the depreciable book value each year for retirement. . . . 100 of the 107 indicate a

C. V. Roberts, Pres.
Roberts Filter Co.
Darby, Pa.
and
P. N. Engel, Pres.
Infilco, Inc.
Chicago

Rossiter Scott
Engineer
Dresser Co.
and
Geo. E. Boyd
Wailes Dove-Hermiston
Westfield, N. J.

Hayes Kuhns
Leadite Co.
Killbuck, Ohio
and
C. E. (Ed.) Palmer
Palmer "Filter Sweeps"
Erie, Pa.

Oscar Sutherland
Supt. of Water
Sioux City, Ia.
and
Peter Asprey
Water Comm.
Sioux City, Ia.

Ed. Kinney
Indianapolis Mgr.
W. & T. Co.
and
Everett Robbins
Supt. of Water
Scottsburg, Ind.

balance in the reserve of 27 per cent of the book value of the depreciable property. . . . 16 carry cash reserves, while 87 carry a book figure and use the money for replacement and extension. . . . 90 of 145 plants use some sort of standard system of accounting, either the NARUC system, AWWA's system, or that of the state regulatory body. (These systems, however, vary widely.) . . . 52 of the 145 utilities have had appraisals mostly at the time of purchase but none has had an appraisal in the last ten years.

Mr. Veatch recommends a standard accounting practice for depreciation, independent of city and debt service, and dependent only on actual depreciation. Straight line depreciation, sinking funds, or service life methods may lead to a reserve greater or less than the actual depreciation unless checked against engineering valuation. Many cities have more than 27 per cent reserve indicated by the "straight line" method, and this is improper according to Mr. Veatch, who also believes that water works funds in municipalities should be used solely for water works needs, and not diverted to general municipal funds.

Two Distinguished Prexys

Malcolm Pirnie
Consulting Engr.
New York
(President of ASCE.)

John H. Murdoch
Attorney
Am. A. W. & Elec. Co.
(Pres. Pa. W. Wks. Assn.)

Dollars and Sense Of Depreciation

Under this provocative title, Louis R. Howson (Diven Medalist, 1944) of Alvord, Burdick and Howson, Engrs., Chicago, gave a paper which in effect amounted to an abstract of a special AWWA committee report on this subject. This committee had been appointed last January to study the NARUC report with special reference to its application to the water utilities, and particularly as regards the methods of establishing depreciation rates and depreciation reserves.

Pointing out that depreciation was inevitable but that methods of establishing depreciation were variable, Mr. Howson proceeded to direct attention to the major items with which the AWWA committee report disagrees with the NARUC report as follows:

1. "A fundamental divergence in the definition of depreciation" between AWWA and the NARUC Committee, as well as "NARUC's own Uniform classification of accounts."

2. Disagreement with the "recommendation that the 'straight line' method be used" for both annual depreciation and accrued depreciation.

3. Disagreement with the "statement that the reserve computed on the straight line basis *is the actual* depreciation. . . ."

4. Disagreement with the "recommendation that the depreciation reserve be increased to that computed on the 'straight line' basis by charge to surplus or otherwise."

Quoting several legal definitions of depreciation, and one from the NARUC Uniform System of Accounts, Mr. Howson pointed out that the NARUC Committee on Depreciation diverges materially from all of these definitions, the best of which is that of former Chief Justice Hughes, ". . . depreciation is the loss, not restored by current maintenance, which is due to all the factors causing the ultimate retirement of the property. These factors embrace wear and tear, decay, inadequacy and obsolescence. Annual depreciation is the loss that takes place in a year."

Further quotations from Mr. Howson's report follow: "Depreciation and amortization are not synonomous. It is depreciation with which water works properties are concerned. . . . Depreciation occurs and must be financed. . . . Recent analysis of figures from 181 *privately owned* water works shows that the annual rate of depreciation is 0.99 per cent of the book cost and the credit balance in the depreciation reserves averages 13.4 per cent. (Compare this with the average *municipal plant* rate of 1.77 per cent and 27 per cent reserve for the items mentioned by Mr. Veatch.) . . ."

Further highlights of Mr. Howson's paper include these:

"The NARUC committee report does not apply only to privately owned utilities. The AWWA committee has no disagreement with the general principle that accrued depreciation and annual allowances

To These—Honors and Awards

Louis R. Howson
Chicago
(The Diven Medal)

Chas. B. Burdick
Chicago
(Honorary Membership)

Frank E. Hale
New York
(Honorary Membership)

Thos. H. Wiggin
New York
(Honorary Membership)

Noel Chamberlin
Newark, N. J.
(The Goodell Prize)

E. L. Filby
Field Director
Water and Sewage Wks. Devel. Comm.

Arthur T. Clark
Secy.-Mgr.
Water and Sewage Wks. Mfgrs. Assn.

must be in step but disagrees with the idea that the pattern of the 'straight line' theory should be applied to long-lived water works structures."

Commenting on the fact that, in the case of cast iron mains or other long-lived structures, it is impossible to estimate the life of such items or the salvage value at any far distant mortality date. "Simple though that idea may sound," Mr. Howson said, "This type of simplicity apparently consists in drawing a straight line from an unwarranted assumption to a foregone conclusion. 'Actual loss in value not restored by current maintenance' is not influenced by whether the line is straight or curved or what bookkeeping entry may be made."

In the paper, Mr. Howson said that accrued depreciation should be determined by inspection of the property, study of operating records, present and future needs. In short, a valuation by a competent engineer is the only sound method of arriving at a truly fair figure.

Mr. Howson further bemoaned the confusion in the NARUC committee report between fact and theory, saying, "the statement that the accumulations in a depreciation reserve by a straight line method are 'actual depreciation' is believed to be inaccurate, misleading, and unfortunate. *The proper theory should be made to agree with the facts, not the facts warped to agree with a theory which is in conflict with universally recorded experience.*" . . . This statement refers to water works experience and not to other utilities.

Retroactive adjustment of the reserves to agree with the straight line depreciation theory as recommended by the NARUC Report, was criticized by Mr. Howson who concluded with the statement that to expect water utilities to make up the difference between their present reserve and that recommended by NARUC, while not being allowed to charge any of that to the consumer, was not proper; for "requiring utilities to deduct from value that which they were never permitted to collect through rates is contrary to all precedent and ethical procedure."

Eight New Directors

Arthur T. Carr
Supt.
Ridgewood, N. J.

Harrison H. Caswell
Supt.
Ann Arbor, Mich.

E. Sherman Chase
Consulting Engr.
Boston

Clark J. Cramer
Chief Engr.
Lexington Water Co.
Lexington, Ky.

Hugh S. Dewey
Manager
Westn. N. Y. Water Co.
Buffalo, N. Y.

Dave L. Erickson
City Engr. and Dir. Public Wks.
Lincoln, Nebr.

Wm. C. Morse
Supt.
Water Dept.
Seattle, Wash.

Chas. H. Young
Distr. Engr.
Pa. Dept. of Health
Meadville, Pa.

Comments by the Audience

Objecting to the Association's committee report being given the status of representing the Association's official views, M. P. Hatcher, Ch. Engr. and Director of Water, Kansas City, Mo., asked for fuller discussion and a chance to present the NARUC side of the argument before the committee report is adopted as representing the views of AWWA.

Col. T. H. Wiggin, Cons. Engr., New York City, said that in the main he agreed with Mr. Howson, and he further told of a meeting with members of the NARUC committee and the request of SEC that NARUC clarify some of its sections on surpluses. Col. Wiggin also said that, despite the finality of the tone of the report, the committee itself said the report was not final; and he suggested that these comments of Mr. Howson's and the AWWA committee report should be sent to the main body of the National Railroad Utilities Committee, not just to the NARUC committee on Depreciation, that being a small committee of accountants who issued the report objected to by Mr. Howson's committee acting in the interest of the water supply industry through AWWA.

Boyd Bennett, Pres. of the Water Utilities Service Corp. asked if the NARUC report was to be a rigid document or subject to revision after it is finally issued. Col. Wiggin replied that the NARUC committee was to be a continuing body. Mr. Bennett also asked if the AWWA committee on survival and retirement was to be continued and the reply was yes.

Mr. Howson said that he believed that any decision on the finality of the NARUC report will go before the Supreme Court.

Inter-System Connections

Water supply inter-connections in Western New York were reviewed and explained by Newell L. Nussbaumer, Commissioner of Public Works of Buffalo. Briefly, the problems involved the city of Buffalo and the suburbs around and to the north of it. All of the suburbs around the city are supplied by a private water company and two other small villages nearby are supplied by local municipal water plants. On the advice and suggestion of Earl Devendorf, Water Coordinator of New York State and the National Board of Fire Underwriters, a program of inter-connections was undertaken. Construction of the facilities was paid for in whole or in part by the F.W.A. Of the inter-connections, nine are of emergency type for connection through fire hose across the city line from one supply to the other.

One of the inter-connections serves as an emergency suction line to a booster station on the private system. Another consists of a pumping station and connection to serve the water tank of a neighboring suburb on the north. Through

this station may pass up to 7 mil. gal. a day of which not more than two may be resold to the two communities farther north. In general this station actually furnishes up to three mil. gal. a day and pressures and supplies have been greatly improved in this area.

The importance of such interconnections in time of disaster were forcibly demonstrated when ice clogged the intake of the private water supply for a number of hours. Water from Buffalo through one of the inter-connections at the rate of 4½ mgd. was supplied during this period. On another occasion when a sixty inch main in Buffalo broke, plans were made to obtain water for Buffalo from the private system if shut-off had not been accomplished in a short time.

Inter-Conections in New Jersey

Experiences in the recent installation of inter-connections in New Jersey were described by H. T. Critchlow, Engr. in Charge, N. J. State Water Policy Commission. In particular 15 inter-connections costing $90,000, of which 8 were in the metropolitan area and 7 in the Camden area, were discussed. Of these ten had been urged in a report of a survey in 1938-40 but it was not until 1942 after entry of the U. S. into the war that an emergency commission set about the work.

In the State of New Jersey 270 inter-connections exist of which 107 are normally used. The recent fifteen inter-connections were constructed partly because of war need and partly for other obvious reasons. Wise use of these inter-connections in time of disaster rests with the N. J. Water Policy Commission, which through a committee on Service Interruption Schedules, has developed a schedule of the inter-connections to come into play in case of breakdown of any one or more of twenty-four systems. Some of these inter-connections have also been used in case of drought, in case of failure of lines, and in case of power failure. Obviously the experience in New Jersey has shown that inter-connections have ample peace-time use and double reason to exist as in wartime.

Metropolitan Water Supply Districts

Originally scheduled for the first session of the Plant Management Division this paper on "Metropolitan Water Supply Developments" by Pres. Sam Morris was given at the second General Session. Referring to Rome in the time of Frontius as probably the first metropolitan water supply district, Pres. Morris discussed the growth of metropolitan areas since 1790 and the more recent rapid growth of areas outside large cities.

Boston with its early supplying of communities up to 10 miles from the city was one of the first districts in this country. Hartford, Conn., was a district formed by the state. In Chicago the Sanitary District was the first application of the water supply district idea to a sewerage system.

Hosts

J. E. Johnson, Mgr. Sales Badger Meters, Milwaukee

H. P. Binder, Mgr. Pump Div. Allis-Chalmers, Milwaukee

W. B. Marshall, Mgr. Sales Promotion Chain-Belt Co., Milwaukee

California has many water supply districts, most of which are created by special law for usually it is found that old laws do not quite fit the case at hand. Los Angeles district as with others has definite provisions regarding voting and indebtedness. The newest water district is the San Diego County District, which strange as it may seem, may not purchase or own water within its own county. The purpose of this district is to obtain water from the Colorado River. Another unique district is that of Salt Lake City where only the land within the city limits is included in the district, but it is authorized to own the supply and water ditches and has a contract with the Bureau of Reclamation to obtain water.

Program and Policies of OWU

Speaking on "The Program and Policies of the Water Division of OWU," Arthur E. Gorman, Director of the Division, mentioned that it had been two years since "Cap" Krug had first put up to water works operators, the problems that would confront them during this war. Things have changed somewhat since then.

Of today Mr. Gorman said: "Don't defer plant maintenance, but non-essential and long term contracts should be set aside for the future, which however should be planned for. There will probably be more problems in the future but at the present the situation is about as follows: form lumber is tight, and will be until the war is over; steel plate and sheet steel is critical *now;* fractional horsepower motors are still critical; the Water Div. has recommended an amendment (to be effective that day—June 15) that all bronze meters could again be manufactured up to the limit which had been set on iron bodied meters." This statement met with considerable audible approval.

Mr. Gorman asked for the help of the AWWA War Practice Committee to aid in deciding the distribution of the limited number of meters. More liberal availability of copper is being urged by the Water Division. Pumps are now generally available. Persons who are embarrassed by restrictions should let the Water Division know, he may receive some valuable help.

A new, simpler and shorter Form 2774 has been issued, lumping of many small items is allowed. . . . Deferment has not been too bad but need for men will keep water works men on their toes. The grave concern of last February over drought conditions has largely been allayed by plenty of rainfall except in certain areas. . . . If fuel is short, call on the Water Division. Mr. Gorman summarized the work accomplished by the Water Division (37 employees) in the past two years, and made these pleas:

1. Limit construction to must projects.
2. Keep maintenance and repair at high levels.
3. Plan post war projects now.
4. Expect some things to remain tight although the general situation is improved.
5. Expect to lose five per cent of man power, that being about the number of men under 26 in the water supply field.
6. Continue cooperation with the Water Division which has to date enjoyed excellent cooperation.

Legal Limits of Water System

Under the title of "The Legal Limits of a Water Supply System," John H. Murdoch, Jr., Attorney, American Water Works and Electric Co., and long President of the Pennsylvania Water Works Assn., spoke on the legal liability of water utilities under the new USPHS Drinking Water Standards.

According to the standards it appears that the limit of legal responsibility of the utility begins on one end at the water supply and ends on

the other at the open tap in the consumers premises. "If this be so," said Mr. Murdoch, "then the water works is responsible for any pollution that occurs on a consumer's premises by virtue of cross connections or faulty plumbing."

Such responsibility is not possible and the water works cannot assume that responsibility according to Mr. Murdoch for several reasons. In the first place a stranger may not enter a consumer's premises and has no obligation to be responsible for what occurs thereon. The basic right of property is so recognized that present custom has developed from it and the legal limit of a water works responsibility is at the curb line. The installation of meters is a special modification under a contract and does not change the legal limit.

Considered under the idea of police powers, it may be said that such does not change the legal limit of liability. Police powers are not unlimited and may be used only when necessary, so long as they are just and reasonable, otherwise they are not valid. Mr. Murdoch does not view as just, reasonable or possible of fulfillment, any requirement that water works officials enter and search all plumbing and piping on private premises, and says that none of the regulations of police power changes the legal limit of liability on the water utility.

The right to forbid establishment of supply cross-connections is appropriately a power of water utilities, but that does not make interior piping a responsibility of the utility. The new USPHS Dept. Standards do not distinguish between a cross-connection and an inter-connection, but makes all private property such as piping and plumbing, a responsibility of the water utility. Under these standards, any defect in private plumbing constitutes a sanitary defect in the water supply system and therefore prevents the water supply from being certified by the USPHS as safe for use on interstate carriers.

Mr. Murdoch emphasized the point that AWWA should not accept responsibility to search out such defects but if defects are known, then water works men are duty bound to inspect and seek remedy of the situation.

Comments on the USPHS Standards

In discussing Mr. Murdoch's paper, Boyd A. Bennett, Pres. of Water Utilities Service Corp., New York, reviewed the adoption of drinking water standards beginning with the 1914 standards, and Mr. Bennett pointed out that AWWA had not adopted the 1942 standards either before the USPHS adopted them or since. Mention was made of the conference this past April between AWWA and the USPHS and Mr. Bennett said he believed that the Public Health Service was agreeable to changing the standards but that as yet no known action had been taken in that direction. Apparently the Public Health Service realizes that the attainment of the standards is not possible either immediately or in the near future but takes the long term view that the standards are something toward which to work. Unfortunately, the courts, the public at large, and the water works utilities view the standards as something that must be met now or certification cannot be obtained. Certainly this is the existing language of the Standards.

Mr. Bennett emphasized the point that the public will want certified water and will believe a non-certified water, however good it has been considered in the past, as not good enough if it fails to receive Federal approval for serving on common carriers.

Citing cases, Mr. Bennett stated that no known water supply could be certified at the present time under these standards as fit for use on interstate carriers. The unreasonableness of such standards according to Mr. Bennett, is evident from the lack of correlation of number of samples to the number of railroads taking water in a community. A small village supplying three railroads would be required to take but a very few samples per month, whereas a large city supplying one railroad would be required to take a large number of samples.

Because of the lateness of hour (the session having overrun the scheduled time), there was no discussion from the floor although corridor conversation indicated a high degree of interest in the topic.

Blueprint Now Summarizes

Nearing the end of the ten months allotted to the committee on Water and Sewerage Works Development to bring the message of Blueprint Now to the country, E. L. Filby, Field Director for the committee, gave a complete review of the work of the committee and of the results accomplished.

Following the American way of selling an idea, by presenting it to the public through the media of the spoken word and the printed page, Mr. Filby, representing the committee has appeared all over the United States and in Canada selling the idea at meetings of water works or sewage plant operators. Brochures have been distributed, stickers printed for use on letterheads, and envelopes. In summarizing his travels of some 50,000 miles to "sell" the idea, Mr. Filby said, "We have tried to prepare the ground. We have tried to sow the seed. We must now ask you to cultivate the crop and to reap the harvest of postwar development of water and sewage."

Mr. Filby reviewed the six basic items of the committee platform: An appraisal of needs for water and sewage works improvement or construction.—Development of programs to meet these needs.—Preparation of detailed plans and specifications for needs of first importance.—Consideration of and development of methods for financing necessary construction.—Re-appraisal of the authority under which the construction will be carried on.—And definite scheduling of the construction program (immediate purchase of land, rights of way, etc.).

As to the effects of such a program on the post war period and its help in bridging the gap from war to peace, Mr. Filby cited figures on the employment situation as follows: ". . . in 1940 there were 45,166,000 persons gainfully employed in the U. S. A. and during demobilization we must plan to reabsorb 14,570,000 persons or 32.3 per cent of the 1940 gainful employment in industry."

As to the goal of post war planning in this field Mr. Filby said it should be set at the point where water and sewage works are needed. Normally such works account for about 7 per cent of the construction industry. As of May 31, it is reported that water projects proposed in this country amount to $326 million and $139 million in Canada. Of these $169 million in the U. S. and $19 million in Canada are already being designed. Added to this sewerage projects amounting to $666 million in the two countries with $326 million of that under design, it appears that with a total of $524 million worth of construction "on the boards" an equivalent of three year's normal work is now being designed.

Mr. Filby emphasized the stand of the committee as against federal aid to communities and mentioned that such policy agrees with that of the American Municipal Association Executive Committee.

Regarding the method of paying for improvements Mr. Filby had this to say, "Water and sewerage are two

utilities that can be financed by rates or service charges and are not only self supporting but are self-liquidating. In this connection it may be noted that management of these two utilities under one department may result in better financial status of both utilities and more economical operation . . . (two outstanding cases were cited) . . . The combination of the two utilities under one management should be a worthwhile contribution to post war planning."

With a plea to improve public relations to gain the support of the public, Mr. Filby closed with the words, "The time for talk has run out. The time for aggressive action has arrived. The time is *here* to **Blueprint Now!"**

(Mr. Filby having served the Committee on Water and Sewage Works Development the agreed time returns to his engineering practice with Black and Veatch on July 1.—Ed.)

Post-War Planning in New York

According to Earl Devendorf, Asst. Dir., Div. of Sanitation, New York State Dept. of Health, the State of New York has appropriated 7½ million dollars for post war planning. The provision of the State Public Works Planning Commission makes it unnecessary for any municipality to put off post war planning. Up to a limit of 2 per cent of the cost of the project (with that sum to be matched by the municipality), the state will provide funds for actual design at the present time.

Mr. Devendorf explained the workings of the provisions of the State Planning Commission, regarding review of plans, etc., and stated that this program means that construction will start on a number of water works projects in the State of New York immediately after the war.

Post-War Plans in the Southwest

The "Great Southwest," having shown considerable development industrially during the war, is on the brink of further development after the war, according to Homer A. Hunter, Supt. of Water, Dallas, Tex. There has been little work in the past three years in expanding water supplies in this semi-arid section, but the fact that industrial capacities are limited only by water resources means a great development after the war.

Southwesterners having shown an adaptability for processing raw materials in which this section abounds, it is only to be expected that greater industrial growth (and water consumption) are ahead for the Southwest. These water facilities must of necessity include water conservation, dams, and storage.

Like Mr. Filby, Mr. Hunter is against Federal donations to construct such works and believes that all such plans for improvements should start at the grass roots, i.e., the local level.

Water Works Financing In the Northwest

While not speaking directly about post war planning in the Pacific Northwest, G. B. Schunke, Asst. Supt. of Water, Seattle, described the methods used in financing water works improvements in that section of the country. The use of the general bond issue is becoming obsolete, while the use of utility revenue is becoming important. Local improvement bonds have proven popular as they are tax exempt and spread the burden of mains to vacant property as well as built up sections.

In considering improvements Mr. Schunke said three questions are asked, will the extension increase the capacity, is it necessary as well as desirable, and is it self-liquidating?

Mr. Schunke said the Pacific Northwest believes that each community is its own master and needs no state or federal control except as to a standard method of accounting, and he closed with the thought that the people from that section have faith in the future for they believe it will be what they choose to make it.

Economics of Electric Power Pumping

Mr. C. A. Richardson, Application Engr., Centrifugal Pump Dept. of Allis-Chalmers, Milwaukee, gave a technical discussion of the factors involved in the choice of centrifugal pumps and their motivating power.

Because of variable demands for a water pumping station, there must be a provision for meeting such conditions. This may be by elevated storage, parallel units, steam turbine, throttling, variable speed motors, and variable speed couplings.

Mr. Richardson confined himself and his remarks to the last three items, and made no reference to the use of steam pumping engines or diesel power as compared to electric pumping. For electric drive centrifugal pumps, variable speed drive may be worth the cost if the speed variation is greater than 20 per cent.—"Tex-rope" drives with 98 per cent efficiency will operate over wide speed variations, and may be worth looking into.

Efficiencies of variable speed couplings both hydraulic and magnetic were also discussed. The use of one constant speed pump to carry the base load and one variable speed unit to take care of the fluctuations was presented as a combination that had proved most successful.

Mr. Richardson concluded with the statement that the most economical arrangements depend on local conditions, and may be new variable speed units in the future.

PAPERS BEFORE THE PLANT MANAGEMENT DIVISION

(Reported by George E. Symons)

Opening under the Chairmanship of Frank C. Amsbary, Jr., Manager, Illinois Water Service Co., Champaign, Ill., the P. M. & O. Division heard considerable about the water works system of the host city.

Design and Construction of Milwaukee System

Mr. Joseph P. Schwada, City Engr., Milwaukee, and capable Chairman of the Local Convention Committee, reviewed the history of Milwaukee's Supply and Service.

Milwaukee's original plant was built in 1874 and in its pumping station exists the first and the last triple expansion steam pumping engines built in this country.

With over a thousand miles of mains, Milwaukee keeps up a continuous pitometer survey to minimize leaks and wastage. Studies of demand and consumption curves has resulted in using stored water for peak consumption periods which in turn resulted in improved pressures throughout the city.

Mr. Schwada told also of studies of main jointing compounds, comparing the leakage of different compounds and lead at different ages of joints as well as the failure pressure for different joints.

Maintenance and Operation Of Milwaukee System

The Milwaukee Water System serves 664,000 persons, of whom 602,000 reside inside the corporate limits according to Herbert H. Brown, Superintendent, and Chairman of the Local Host Committee. The plant itself consists of 32 filter beds of 6¼ mgd. capacity each, with dry feed chemical treatment and chlorination. Cost of operation is $6.52 per mil. gal.

Of 99,000 services, 99.8 per cent are metered, and the metered services account for 92.5 per cent of the water pumpage. Meters are read monthly and it is estimated that 13.2 per cent of the total water pumped in non-revenue water used is for flushing,

Homer Beckwith
Distr. Mgr.
Pitometer Co.
Pittsburgh, Pa.

Baxter F. Wade
Supt.
Water Dept.
Jackson, Miss.

W. C. Sherwood
Vice-Pres.
Hersey Meter Co.
Boston

A. E. Berry
Chief Engr.
Ont. Dept. Health
Toronto, Ont.

A. T. Luce
Chief Engr.
N. Y. Wtr. Service
N. Y. City

W. W. Morehouse
Director
Water & Sewerage
Dayton, O.

Clint Inglee
President
Natl. Main Cl. Co.
N. Y. City

fire hydrants or is lost in leaks or otherwise unaccounted for. Special rates for water are charged to suburban areas.

One of the problems in Milwaukee is that of varied makes of meters. Inasmuch as the customer owns and installs his own, there are thirty-one types of meters in use, and inasmuch as the department repairs the meters, a large stock of varied meter parts is required.

Control of Centrifugal Pump Valve Discharge

One of the problems in operating centrifugal pumps is that of pump reversal on shutdown. So said H. B. Hoefer, Ch. Engr. of Power Plants, Dept. of Pub. Works, Milwaukee, who explained "The Development of Centrifugal Pump Discharge Valve Control at Milwaukee's Riverside Pumping Station."

Best method of combating the problem is to install two valves, one a check valve, and the other a hydraulic control of discharge operated in starting and stopping. In spite of several objections to two valves the advantages outweigh the disadvantages.

Mr. Hoefer believes that the function of a water plant is to supply water first, and secondarily to furnish it economically. Therefore safety of operation should take precedence, and the installation of these two valves is a matter of safety of operation.

Citing a case where failure of a check valve, alone, to work had caused an outage of 30 days and an expense of $2,800, Mr. Hoefer pressed his point for the dual installation as a means of protection against damage to centrifugal pumps.

Many hydraulic control valves are considered a mechanical gadget which will easily "get out of control." To offset this criticism in Milwaukee an improved control was designed and developed. The operation of this valve is based on the pump rotation, which gives a positiveness of operation because the discharge valve cannot open until the pump has reached a certain speed and will close when the pump speed drops to that same speed. Its operation is not dependent on the velocity head, and will open only when the pump is rotating in the proper direction.

Mr. Hoefer concluded with the statement that all efforts should be in the direction of making pump reversal impossible, and to do so requires the combination of check valve and hydraulic discharge control valve, the latter of which should be designed in such a fashion as make its operation approach that of the automatic check valve.

Distribution System Studies

In the absence of Geo. W. Booth, Chief Engr., National Board of Fire Underwriters, New York City, his paper on "Practical Studies of Distribution Systems" was read by Robert Dennett, Hydr. Engr., of the same organization.

Utilization of the Hardy Cross Method of distribution system flow determinations, or other formulas and calculations are not the *only* methods of making flow distribution studies; neither is measurement of flows by pitot tubes the only method. There are at least two practical methods being used in a number of places not only by the Bd. of Fire Underwriters but by municipalities. These are the water plane survey and the fire flow tests.

The water plane test consists of determining the pressure throughout the city, at known elevations, preferably by recording gages, and then plotting these data as water plane elevations on a map with all elevations of the same value connected by a continuous line. These lines which were not named by the speaker, but which might be called iso-heads, are not necessary, and in fact may vary from time to time depending on the consumption of water. Where there are marked drops in the water plane elevation below normal the need for special studies is indicated. Such drops in water elevation may indicate closed valves, heavy local consumption or serious leakage.

Mr. Booth's paper reviewed the disadvantages of the use of the pitometer to determine "C" values in large systems, and the limited use of the Hardy Cross method or electrical network analysis. Mr. Booth also reviewed the early work of the Nat. Bd. of Fire Underwriters pointing out that with more than 450 cities of

M. L. LeJeal
Hayes Mfg. Co.
and
Lester L. Buzzard
Mgr. Sales
Hayes Mfg. Co.
Erie, Pa.

John Hassler
Director Research
and
Martin Fay
Sales Engr.
Nuchar Div.
W. Va. Pulp & Paper Co.
N. Y. City

Julian B. McFarland
Director Publicity
and
Carl N. Brown
Chicago Manager
U. S. Pipe
Burlington, N. J.

John W. Pray
Supt. of Utilities
and
C. B. Pilcher
Water Comm.
Fort Dodge, Ia.

Max Fishtein
Service Engr.
and
M. M. Borden
Vice Pres. in
Chg. of Engineering
Simplex Valve & M. Co.
Philadelphia

25,000 or greater population it was impossible to spend months studying the systems by pitot tube or measurement and analysis.

The obvious answer to water availability was to open fire hydrants and determine the flow of water and residual pressures. Methods of determining flow presented another problem. The use of piezometer rings on special nozzles was clumsy and it was finally decided to use a pitot tube which indicates the velocity of the stream on a gage. Choice of and number of fire hydrants was also important.

Reviewing the procedure of conducting fire flow tests Mr. Booth said that a central hydrant in a group was picked to indicate the average static pressure in the group of six or eight hydrants while the flow is measured at the surrounding hydrants. Details of the procedure are described in the October, 1924, issue of the AWWA Journal.

Having determined by flow tests the capacity of the system at various points, the next step is to determine the reinforcement necessary and to fix on the quantity of water needed for fire-fighting protection. This latter is generally done by a formula and table in which the size of the city is related to the fire flow required.

Mr. Booth also commented on the matter of choice of main size, saying that the tendency to be economical and use 4-in. pipe is a mistake, fortunately now, almost relegated to the past. The tendency to use in-between sizes of pipes is frowned on.

It is often better to lay two 16-in. mains some blocks apart than to use one 20-in. main although the equivalent capacities are not quite the same. The two smaller mains contribute toward a better grid system and toward reliability of the system in the event of a break.

From studies of loss of pressure in grids when a group of hydrants is in use, the Underwriters have recommended that the minimum size of pipe for residential districts be 8-in.; 6-in. to be used only where it completes a good gridiron and in no case in blocks of more than 600 ft. in length. The value of 8-in. pipe especially in parallel lines along the long side of city blocks is shown in considering the arrangement of secondary feeders.

Mr. Booth's paper also discussed arteries, master plans, elevated tanks and their location as a part of this practical study of distribution systems and concluded that the distribution of water depends on many factors which vary, that attempts to make a complete analytical study requires too much time and effort, and that present and future needs can be more easily determined by this simple, practical, and long used method of making hydrant flow tests in a systematic manner as a routine check on conditions within the distribution system.

Comment From the Audience

Mr. Homer E. Beckwith, Dist. Mgr., Pitometer Co., Pittsburgh, said that their measurements are made in addition to the fire flow tests and have proved their worth in many instances.

Mr. Thomas Skinker, Director of Public Utilities, St. Louis, told of a case where the distribution system wasn't at fault. At a large fire, the hydrants at the center of those in use had 10-15 lb. pressure on the suction side of the pumps, but hydrants at the outer circle of the group in use had zero pressure. After considerable investigation it was determined that the outer group of hydrants had not been completely opened. Since that time, each fire station has been supplied with a detailed drawing of a hydrant and a sign calling attention to the number of turns required to fully open a fire hydrant.

Prof. W. E. Howland, Civ. Engr., Dept. Purdue University, recommended the use of Hardy-Cross method, in the case of predicting new systems, as a check when one's common judgment was felt to be either in error or doubtful. In short, Prof. Howland says that where new systems are being designed a good engineer can generally predict what should be used, but if he is in doubt he can use the Hardy-Cross method to good advantage to check his judgment.

Melvin P. Hatcher, Ch. Engr. and Director of Water, Kansas City, Mo., said that distribution systems in general deserved more study because they make up such a large percentage of the total value of a water supply system. In the case of Kansas City the study cost $5,000 and was worth it. Mr. Hatcher also believes that the Hardy-Cross Method of evaluating system flows is a good adjunct to the pitometer survey.

(To Be Continued)

In our next issue will be reported the proceedings of the

Joint Session of Plant Management and F. & A. Divisions
Session of the Finance and Accounting Division
Purification Division Sessions
Steel Pipe Committee Session
Ground Water Committee Session

The Manufacturers Elect

Charlie Becker as President; Casey Jones as Vice Pres.

At the annual meeting of the Water and Sewage Works Mfrs. Assn., held in conjunction with the A.W.W.A. Milwaukee Conference, the following firms were elected to the Board of Governors and Executive Committees of the Manufacturers' Association for 3-year terms:

To the Board of Governors

Wallace & Tiernan Co.
Hydraulic Development Corp.
Permutit Co.
Link-Belt Co.
Barrett Div. of A. C. D.

To the Exec. Committee—Water Div.

Stuart-Brumley Corp.
Pittsburgh-Des Moines Steel Co.
A. P. Smith Mfg. Co.

To the Exec. Committee—Sewage Div.

Chain Belt Co.
Ralph Carter Co.
WATER WORKS AND SEWERAGE.

Following the annual meeting the Board of Governors met and elected as President, Chas. A. Becker of the R. D. Wood Co., and as Vice President, Everett M. Jones of Simplex Valve & Meter Co. Edgar Buttenheim of "American City" was re-elected Treasurer.

SELLING POSTWAR PLANNING TO THE LOCAL TAXPAYER & GOVERNING BODY*

By FRANK D. LIVERMORE
Mayor
RIDGEWOOD, NEW JERSEY

Mayor Livermore, himself an engineer, is a man who knows whereof he speaks when it comes to planning additions or improvements to water or sewerage plants and systems. The accompanying paper with its touches of humor was one of the highlights of the New Jersey Sew. Works Assn. meeting. Mayor Livermore's talk contains some of the best advice water or sewage men have ever received. It is well worth reading!

The Author

MY telephone rang late one afternoon and a familiar voice informed me that a few convivial friends were to meet at his home that evening to explore the various phases of human emotions as expressed in the putting together of a few hands of draw poker, with suitable variations, and to the accompaniment of fitting refreshments. My attendance was requested.

Not being able to think of a better way to pass the time, I accepted with the comment that my pocket held an assortment of loose change looking for company or a new home. His reply was, "Brother, if you want to sit in on this party, never mind the change, bring some folding money, you may need it."

The Postwar Activities Game

Just as in that poker game, I have a very definite impression that a lot of well intentioned people are going to find themselves in the game of post-war activities, but when the cards are dealt all that they can do is ante a set of plans and then fold up. This is one heck of a way to spend an evening, or participate in much needed improvements. No one subscribes more wholeheartedly to the idea that fully detailed plans should be prepared and carefully checked and re-checked to avoid the asinine expedients resorted to only a few years ago when all hands were caught napping; but, at the same time, no one rebels more at the extravagant costs and loose financing than I.

This is no partisan political criticism of what has happened, as I am inclined to think that ERA, WPA and what have you, did not have any worse odor or fouler effluent than the Teapot Dome mess of a few years ago. Be that as it may, just remember that when you pay your income tax, you are helping to pay for some of the so-called "free grants" which were dished out for some of the most gosh awful projects ever devised by man, and that one of the ways to stop that is to have real plans for real work ready PDQ.

Sound Financial Plan Important

Fully as important as plans, if not more important, is a sound financial program. At the risk of bringing a storm of criticism on myself, it is my firm conviction that the more the expenditures are made and controlled by the local governing body, the less the total cost and the more the ultimate fitness and efficiency of the project. I would have no qualms at all in accepting a federal grant of let us say 50 per cent of the cost of some major work, provided the job could be done the way we planned it.

From past experience, that "provided" isn't as easy as it sounds and it behooves us to examine carefully with a sharp eye, whatever agreements may be concocted in the future to cover such grants. When I recall some of the conditions and some of the bosses, supervisors, checkers, time keepers, water boys and would-be engineers of days not too long past, the chances of getting something done when and how *you* want it done are about as remote and costly as trying to fill a bobtailed flush in an eight-handed game.

Past experience has indicated that the proportion of overhead costs in connection with these so-called grants rises as the construction cost of the project decreases. Therefore, the smaller the job, the worse the headache gets. If your town is one of the few not enjoying high tax collections and consequently improving its financial status, you had better buy a plentiful supply of aspirin now for you certainly will need it before long.

Where Is the Money Coming From

Even under the most favorable circumstances, we must keep this fact definitely in mind—at least half or more of the cost of proposed work must be borne by your own municipality, if a real job is to be done. Along this same line, I do not subscribe to the idea that post-war planned work is merely something to take up unemployment slack, valuable as that is; but rather is something intelligently planned and executed to fill a definite need, and from which the community will derive the full value of its expenditures in service rendered to its citizens and taxpayers.

It seems to me that this is the soundest basis on which to sell such a program, and if this be so, what, if anything, have you done or are you going to do in selling the idea to those who are going to pay the bill? Frankly, I see no use in a flock of plans and specifications, no matter how well thought out, unless you match them with the answer to the $64 question; namely, "What are you going to use for money?"

Facing that problem, I know of but one line of approach, first, your governing body and then the public at large. They are the ones who must provide funds by budget appropriations, bond issue or better yet, setting up a capital reserve right now while the getting is good. Sounds easy, but how do you rate with your powers that be when you really want something?

Have you by your own conduct established a cordial feeling of respect for you and the kind of a plant you operate, or have you regarded the Chairman or Commissioner of the

*This paper, presented at the 29th Annual Meeting of the N. J. Sew. Wks. Assn., is printed by permission of the Sewage Works Federation.

Public Works Department as a necessary evil who changes every year or so while you shovel sludge forever, or perhaps as one who rates a sort of professional brushoff whenever he shows up at the plant? There may be some reason for this latter attitude in some towns, but in the main it is not a very tactful way to get money out of him when you need it.

What Is Your Plant Like?

While you are sitting here, let your mind's eye wander around the plant you left behind for the day. What sort of a place is it? Are you glad to have people drop in and look around or does the site resemble a well populated cow pasture whose occupants have no need for mineral oil? " 'Taint funny Magee" when unexpected callers show up. I have seen both kinds and so have you. Now let's stop for a minute and think. How in the name of common sense can you expect consideration for yourself and your plans unless heretofore you have taken pains to acquaint those in authority, by personal contact, with the fact that you really know your business and need their help to really let your talents accomplish something?

Put yourself in the position of an official or taxpayer and then ask yourself what you would do toward furnishing funds on a place which looks as if it had been shot at and not been missed. How much money would you vote to spend under these conditions?

Let me hasten to add that I have the highest respect for the ability, sincerity and devotion to duty of the men in this organization, but every now and then, we find some who are so absorbed in their purely technical problems and experiments that they have overlooked entirely their relations with community officials and the public generally.

Perhaps you feel that your work is done so long as your plant functions properly and don't give a hoot with reference to what the taxpayer knows or thinks about it.

Take Our Plant for Instance!

All of these items will be added up when the score is checked for appropriations and, for what good it may be, I should like to offer an experience or two for consideration.

In our own plant, with which many of you are familiar, I can't help but have complete reliance in and respect for the opinions of our plant engineer, John Hood, because of what he has accomplished in a way perfectly visible to the naked eye and the manner in which operating costs appear in the budget. Because of the existing relationship between us, I find it time well spent to visit with him at the plant and discuss fully, on the ground those things which we like to regard as our mutual problems.

I can even recall a few instances where it seemed entirely fitting and proper to go over matters in my home and occasionally supplementing the discussion with a close view and taste of the dew of the heather plus

Water and Sewage

J. Arthur Carr
Sup't.

John W. Hood
Sup't.

(Get along with Mayor Livermore—but who couldn't?)

some soda and ice. What does this mean? Just this. When John presents a set of plans covering what he considers necessary for future work, I am ready to go to bat for those ideas and feel more than sure of public support for them. You may well ask, "How come to be so sure?" Well, here's how come.

I have been invited to speak before the Civics Department of our Woman's Club on different occasions and have always supplemented my remarks by extending an invitation to the ladies to inspect our entire Public Work Departments. These include Street, Park and Water under the supervision of J. Arthur Carr, as well as Sewage, and all of them are so operated and kept that they have been a source of amazement to our visitors.

The sewage plant is generally our last stop and if you could see the looks of surprise on the faces of most of these women, who incidentally are leaders in thinking in our town, when they find out where they are, you might think they were seeing one of Ripley's "Believe It or Nots."

Instead of a mess, they see well kept lawns, paved driveways, weeded flower beds and freshly painted buildings. Nine out of ten will stop short and sniff like a well trained pointer, and seem disappointed when they can find nothing to point at. They are conducted from one end of the plant to the other and, when they see the effluent, they never cease to marvel at what is being done.

The net result of this is that a representative group of women of this town know how part of their money is spent and have given it their wholehearted approval, and some have gone so far as to return on their own and bring friends to be shown around. Wouldn't you like to have the backing of a group of this kind for some pet project of yours? If so, what are you doing to get it?

Public Relations and Public Education

I sincerely believe that most of you are in a good position as regards your public relations; but if you are not, or if you feel the need for more intensive public education as to the real value of the fine work you are doing, may I respectfully suggest the following:

(a) Check your status first with those who make up your local government. Maybe you will need to adopt some new tactics or polish up the old ones a bit, but most of you have a pretty good line otherwise, so this should not be too much trouble. If you think you need consulting advice, don't be afraid to say so. No one makes too good an impression by pretending to know everything.

(b) Get the Commissioner down some day and both of you take a good look around. If the place needs dolling up put it up to him this way: "How can we expect the public to put up money for improvements or new work when this looks as if we did not properly care for what we already have?" It's surprising what a modest expenditure plus some elbow grease and pride can do.

(c) If your place is in good order or can be made so, don't be bashful, but extend invitations to service clubs, women's groups, etc., to come and see what they are getting for their money, and, at the same time, be ready to point out what you really could do if given the opportunity and some of that folding money. Don't forget to have the reporter for your local paper on hand and, whatever else you do, sell him a bill of goods. Favorable newspaper publicity costs nothing, except going a little out of your way to be courteous to the press and giving them interesting facts, but it pays handsome dividends.

It may be some time before this war is over, so just get busy and don't let all your work and planning come to the sad fate of being turned down because the taxpayer or governing body doesn't believe you need the things you ask for.

GREENVILLE MEETING OF THE S. E. SECTION OF A.W.W.A.

Proves What It Takes to Revive a Section Which Has Gone Sluggish

GREENVILLE, S. C., water authorities and other civic spirited citizens were elated over the effectiveness of the "spring tonic" administered the Southeastern Section of A.W.W.A., which chose Greenville as host city for its 1944 Annual Meeting and Conference held there May 8-10, 1944.

The Chairmen

(Retiring)
John L. Hawkins
Supt. of Water
Greenville, S. C.

(Incoming)
Wm. W. Pointer
Supt. of Utilities
Troy, Ala.

When the registration meter clicked off the record attendance of 274 the Executive Committee of the Southeastern Section knew that their efforts had been repaid and there was ample proof that it takes just two things, principally, to draw a good attendance at water or sewage works meetings—namely, a good technical program and well planned publicity in advance. We might add that such a matter as a trip of inspection, followed by a fish-fry or barbecue, also has its weight in rounding out the "sales appeal" of the publicity committee.

From our observations we would say that one big reason for the interesting and successful meeting in Greenville was one Johnnie Hawkins, Supt. of Water, and his Water Commissioners—Messrs. Beattie, Cleveland and Floyd—who were right with him. Then, too, Mayor McCullough was desirous that the Southeastern Section come to see what "Greater Greenville" had to boast about in the way of a water supply. And, while passing around credits, the "spark-plug" abilities of the red-headed A.W.W.A. Director from the Southeastern Section—Paul Weir—must be taken into account in analyzing the reasons for the successful and rejuvenating 1944 meeting of the Section. Then, too, the manufacturers representatives took a part in arranging a golf tournament at the *close* of the meeting and a "Conviviality Room," where open-house was the order of the evening. This was novel to the Southeastern Section and many enjoyed the opportunity of gathering there with friends for a "wee drop," and to talk shop, swap yarns and even to break forth in some barber-shop harmony in one or another corner. Yes, the ladies were there, too.

A pleasant and interesting feature of the meeting was the afternoon's trip to the scenic Greenville reservoir at the foot of Table Rock Mountain in the "Land of the Sky," following which the automatic chloramination and pH control stations on the Greenville system were inspected.

The Annual Dinner

At the Annual Dinner the principal speech was made by E. R. Oliver, Vice President of the Southern Ry. System, who came down from Washington to talk of the future of the South in the post-war world where inflation was the danger to watch for. He warned that industrial growth of the Southland at the expense of agriculture was a real danger. Now out of balance, agricultural poverty would preclude continued industrial prosperity. A higher agricultural income was to his thinking a necessity if the South was to continue to enjoy prosperity. Mr. Oliver decried the offering of special inducements by municipalities, such as low taxes, free land, water supply at less than cost of production, in order to lure an industry to move from an existing location to another. Basically, it was bad practice and costly in the long run.

Honored

F. K. Ellis
Supt. Public Wks.
Sumter, S. C.
(Voted the Geo. W. Fuller Award)

W. F. Wilcox
Mech. Engr.
Atlanta, Ga.
(Made Honorary Chairman)*

*(*Introduced as the oldest living member of A.W.W.A., Mr. Wilcox joined the Association 51 years ago.)*

Also at the dinner Vice President Newkirk spoke on the affairs and plans of A.W.W.A.—its phenomenal continued member growth, etc.

Nat'l Director
Paul Weir
Asst. Genl. Mgr.
Water Dept.
Atlanta, Ga.

Secy.-Treas.
B. P. Rice
Supervising Engr.
R. F. C.
Atlanta, Ga.

Awards and Honors

As part of the dinner program A.W.W.A.'s oldest living member in terms of membership, with 51 years of continuous membership to his credit, was made Honorary Chairman of the Section. William F. Wilcox of Atlanta was brought to the head table and presented with a special plaque and gavel as mementos of the occasion. He spoke briefly, but with sincerity, when he said that he had gained something of value from A.W.W.A. in every one of the 51 years that he had been a member. And, while he had seen phenomenal advances in the past two decades, he felt that the younger members and prospective members had much to look forward to in their membership in A.W.W.A.

The Geo. W. Fuller Award recipient for 1944 was announced, the citation reading—To F. K. Ellis, Supt. of Water and Sewerage at Sumter, S. C., in recognition of his valued services in the development of ground water supply and activities in the water operator training schools held in South Carolina.

An impressive bit of the dinner program was the singing of the Chapel Choir of Furman University,

"Table Rock" from Which Greenville's Ample Reservoir Takes Its Name. (Snapped on inspection trip during meeting)

Geo. H. Sparks, Supt. Utilities, Eastport, Ga.

H. M. Mathews Supt. Utilities Thomasville, Ga.

Otis H. Stephens, City Clerk, Eastport, Ga.

J. T. Pinkston, Water Comm., Meriden, Miss.

Tom. Starnes, Southern Sales Mgr., ACIPCO Birmingham

Jas. E. Gibson Genl. Mgr., Water Dept. Charleston, S. C.

Newnan, Ga., Delegation with Pres. Sam Newkirk

I. E. Walker, Commissioner, President Newkirk, John Perryman of R. D. Cole Co., and Henry C. Arnall, State Senator and Water Commissioner

Demonstration of Functioning of Cone Blow-off Valve on Supply Line—Was Opened Under Unbalanced Pressure with One Hand Only.

directed by Dr. A. E. Putman and accompanied by Mrs. Putman.

Officers for the Year

The following slate, presented by the Nominating Committee, was declared elected:

Chairman: W. W. Pointer, Supt., Troy, Ala.

Vice-Chairman: W. H. Weaver, City Engr., Decatur, Ga.

Secy.-Treas.: B. P. Rice, Engr. R.F.C., Atlanta, Ga.

Trustees: T. E. Watford (Ala.), Baxter F. Wade (Miss.), A. F. Frick (S. C.), T. H. Jones (Ga.).

Secy. Rice reported that during the year membership in the Section had increased to 217 from 165—a 52 member gain. (This gain almost won for the Section the Hill Cup awarded at the A.W.W.A. Convention, June 15—the Florida Section with a lower potential membership winning first place and the Virginia Section third. —Ed.)

Technical Sessions

(Chairman J. L. Hawkins, Presiding)

The meeting opened with a short talk by C. F. McCullough, Mayor of Greenville, who boasted about Greater Greenville's water supply—a soft mountain supply fed through an all gravity system. (See article describing this impressive system and supply featured in the May, 1944, issue of WATER WORKS & SEWERAGE.) Also he boosted the management of the Greenville Water Department and told how Supt. John Hawkins stood in the community.

The opening paper was presented by Wm. L. Lamar, Associate Chemist, U. S. Geological Survey, Raleigh, N. C. It dealt with **"The Chemical Character of Public Supplies in the Southeastern States."**

Mr. Lamar stated that in the Coastal Plain of the Southeastern States all but the largest cities secure water from wells. In the Appalachian Plain (highlands) ground water is not adequate in quantity or quality and surface supplies are the rule. These waters are almost universally soft, not exceeding 40 ppm. total hardness and without sulphates. The maximum hardness of the surface supplies of the Coastal Plain is 100 ppm., and in general considerably less. The ground waters vary from very soft to very hard waters—principally calcium and magnesium bicarbonates and little if any sulphate hardness or chlorides. The exception to this is in certain west coast areas of Florida and southern Georgia where sulphates are high in well supplies. Coastal Plain wells frequently yield very soft waters high in sodium bicarbonate, the explanation being that these waters have been softened in percolation through natural greensand (Zeolitic) deposits. Salt in southeastern well supplies is explained by pumping rates exceeding the safe yield and thereby salt water penetration. Iron is a problem in numerous wells and in some the water is also organically colored. Mr. Lamar used interesting colored diagrams to graphically depict the chemical make up of certain representative public supplies in the six southeastern states.

Church Where Technical Sessions Were Held and Strange Language Issued from the Pulpit.

"Underground Water Development in the Southeastern Area," by W. S. Beiser, District Engineer, Layne, Atlantic Co., Savannah, Ga.

Mr. Beiser in a scholarly paper discussed the theories and misconceptions of ground water occurrence and flow; the occurrence, movement and extent of subsurface waters and the all important hydraulic gradient. From the standpoint of ground waters the southeastern area is divided into three divisions—(1) Piedmont Area, (2) Unconsolidated Sands Area, (3) Limestone Area of Florida and South Georgia.

Major T. M. Riddick (USPHS) S. C. State Dept. Health Columbia and Carl C. Lanford, Supt. Water, Sewerage, Elec. Greer, S. C.

Chas. Bachmann, Engr. Neptune Meter Co. New York and Geo. W. Cissna, Distr. Mgr., Neptune Meters Jacksonville, Fla.

Modern Sewage Treatment Plant of Greater Greenville Sanitary District

D. H. Hurst, Supt. Water and Sewerage Tifton, Ga. and D. C. Mitchell (Host) Water Dept. Greenville

John R. Purser, Pres. Purser Sales Eng. Co. Charlotte, N. C. and H. A. Perkerson M. and H. Valve Co. Anniston, Ala. (*Chmn. N. C. Section)*

Water Commissioners of Greenville H. C. Beattie (Merchant) W. C. Cleveland (Capitalist) W. A. Floyd (Mill Executive)

"Bill" Lyman, Southern Sales Mgr., Clow-Natl. Pipe, Birmingham H. S. McElvoy, Water Comm., Natches, Miss. "Al." Brumley Stuart-Brumley Co. Baltimore, Md.

Jordan in the Pulpit. Speaking on the "Blueprint Now!" Program

"Matt" Moore, One of John Hawkins' Faithfuls in the Greenville Water Dept.

Geo. W. Kelsey, Genl. Sales Mgr. Builders-Providence, Inc. Providence, R. I. and Wm. W. Pointer Supt. Utilities, Troy, Ala. (Skipper of the Section)

Mr. Beiser in some interesting history of well development revealed that the earliest southeastern wells were those of Charleston, S. C., where wooden casings were employed early in the 19th Century wherein drop drill rigs were employed. Auger drilling began about 1825 and jetting dates from about 1840, with rotary drilling coming in early in the 20th Century.

In discussing the importance and extent of underground supplies, Mr. Beiser estimated that 6,500 of the 10,000 public supplies were ground water supplies. The great majority of these supplies are in communities of 2,500 to 10,000 population. However, such large cities as Houston and San Antonio, Texas, Memphis, Tenn., Savannah, Ga., St. Petersburg, Miami and Jacksonville, Fla., and Dayton, Ohio, are supplied by wells. Mr. Beiser then discussed the several advantages of the gravel wall well in gravel and sand formations. Illustrations were used to depict the gravel wall construction and its advantages such as trapping screen clogging materials and the fine sands within the gravel packed basin surrounding the screens. He pointed out that ground water supply can also be developed in shorter time and at less cost than for a surface supply of the same yield.

"Motor Maintenance" was discussed by D. G. Sudderth Jr., Engineer Westinghouse, Atlanta, through use of the Westinghouse talking film dealing with "Maintenance of Motors and Control Equipment," in which it was revealed that 90% of motor failures have been traced to dirt, moisture, friction heating or vibration. In blowing dirt and dust from motors air pressure should not exceed 50 lbs. Where air alone is incapable of removing air held dirt, petroleum

Programmers

H. F. Wiedeman, Consulting Engineer Wiedeman & Singleton, Engrs., Atlanta

Dan F. Frick, S. C. State San. Engr. Columbia, S. C.

Chas. Bachmann, Mechanical Engr. Neptune Meter Co., New York, N. Y.

distillate should be used in preference to carbon tetrachloride which is more likely to attack the insulation. In stubborn cases a mixture of these two (1:1) may be used. The mixture is nonflammable. Rags should be used in preference to waste. Regarding moisture, standby motors should be run once weekly to guard against accumulated condensation within the windings.

As to lubricating sleeve bearings of motors the film warned against adding oil while the motor is running, since it is easy to add too much oil in this way. The often heard admonition was given about lubricating ball bearings. "Apply the right grease in the right quantities. . . . Whatever you do, don't overgrease!"

[With regrets we cannot cover the "Ten Checks of Electric Control Equipment Maintenance," but would urge the reader to request of Westinghouse, East Pittsburgh, Pa., or any branch office a copy of their illustrated brochure on "The Maintenance of Motors and Controls." This helpful guide is designated as No. B-3316 and covers all points illustrated in the moving picture.—Ed.]

The question of cleaning and lubricating ball bearings was raised from the floor—"What is the so-called *"right"* way?" The answer came from E. S. Lammers, Westinghouse Engineer, who said that ball bearings might be taken down and washed about every 3 years. L. H. Enslow asked if a practical method of insuring against excessive grease in the bearing would not be to leave the plug out after greasing and run the motor thus to throw out excess grease before replacing the plug. Mr. Lammers replied that it was entirely feasible to run a motor with the plug out for an hour after grease application. It would be a very practical method of insuring against over-lubricating, and bearing heating which over-greasing causes. It was a very good suggestion.

"U. S. Army Water Standards of the 4th Service Command," by Major V. Bruce Sundstrom, Chief Utilities Section, U. S. Engineers, Atlanta, Ga.

U. S. Pipers Ramsey Reed Birmingham and Tom. W. McCreery Asst. Mgr. Sales Birmingham

"Bob" Hoy, (left) W & T's Distr. Mgr. Jacksonville, Fla., explains the Differential Converter in full automatic chlorine and ammonia control on Greenville supply.

"Come and Get It!" Filing into the Fish Fry at Dave Stansell's place

"Mfrs.' Conference" "Casey" Jones, Sales Mgr., Simplex Valve and Meter "Dick" Thomas, Sales Mgr., Roberts Filter Co. (Center) and "Art" Clark, Business Mgr., Water and Sewage Wks. Mfrs. Assn.

John B. Chandler The Bristol Co. Atlanta and J. J. Murray, Jr., Pres. Murray Laboratories Greenville

Major Bruce stated that there were 100 water supplies in the 4th Service Command area—13 laboratories and mobile laboratories. 30% of the total water used is purchased from municipalities and 48% is from developed ground water. Chlorination is mandatory as is rechlorination of purchased water. The standard for chlorination is a residual of 0.4 ppm. as the minimum after a 20 min. contact period. This standard applies in all army supplies, not alone the 4th Command Area. Ammonia is used at 2 posts only. Liquid chlorine is used for supplies to all groups of more than 150 men. In the 4th Command Area 570,000 lbs. of chlorine was used in 1943. The Command owns 2,000 chlorine cylinders. The average per capita use of water has gradually been reduced to 80 gpcd. at present for all posts. Prison camps still use 200 gpcd., indicative of wasteful habits.

Major Sundstrom paid high tribute to his water personnel, said that there had been not a single waterborne disease outbreak in any of the 100 posts. Training schools for water and sewage plant operators had been most successful and a good many better trained and equipped plant operators would be coming out of this war.

"Modern Water Plant Design," by H. F. Weideman, Consulting Engineer, Atlanta, Ga.

Mr. Weideman pointed out that there had been no time for design improvements in plants hurriedly constructed during the last 2 years but that "tomorrow" would see some of the following considerations. Design would have to be based on industrial load rather than per capita demand as the base. However, off peak water to industry providing storage facilities should be the order of the day for best economy and lowest production costs to the water taker. Filter rates up to 3 gals./sq. ft./min. would be the order of the times, since proven satisfactory and practical. Anthracite as the filter media seemed of chief value in requiring lower wash rates to float the bed. Anthracite encrusts just as sand does. The Palmer Filter Sweep has its points and has proven particularly beneficial in connection with organic waters. As to water preparation a flash-mix seems desirable in all instances, but mechanical flocculators seemed questionable for plants of under 5 mgd. capacity—gravity mixing chambers being preferred for the smaller plants. Floc carry-over from basins to filters had not proved the problem that had been indicated by numerous operators and designers. Properly formed floc does not materially affect filter performance or wash water requirements. In softening the upflow type clarification units had been proving their worth in chemical savings and deserve more attention in ordinary coagulation practice. Mr. Weideman was confident that the inclusion of a lighted sight-well for ready observation of the quantity of filter effluent had done more to improve operating control than any single element of design. L. H. Enslow agreed with the latter surmise, and said he was thinking back to 1917 when operating the Spartanburg plant. On a bright day, if he couldn't read the date on a dime 10 ft. under water in his open clear water basin, he figured that he wasn't doing so well. Some unbeliever in the audience asked Mr. Enslow if he was doing well much of the time? (Much laughter.)

"Blueprint Today, or Boondogle Tomorrow"

This was the theme of a talk by Secretary Jordan of A.W.W.A., who was doing some pinch-hitting for "Blueprint Now!" Filby attending another meeting.

Mr. Jordan stated that normal construction in the U. S. was at the rate of ten million dollars per year, of which 33% represented expenditure in public works. About 84,500,000 persons are served by public water facilities representing an investment of $40 to $50 per person or approximately 4.2 billion dollars for water facilities. As to deferred maintenance it was reasonable to figure that about $200 per 1000 persons needed to be spent as soon as materials become available—say $17,000,000 for the country to get caught up on maintenance again.

In needed facilities Mr. Jordan cited the U. S. Public Health survey figures (Public Health Reports No. 2535) calling for an expenditure of $803,000,000 at the rate of $80,000,000 per year for 10 years. He pictured the potential for new water plants in the southeastern states by listing the number of incorporated places and the number of plants in each state. Of the 1,412 incorporated places only 768 have water plants, so there is plenty to be done in the southeast. The potential in new water supply systems broken down for size showed the following—

State—	Populations (Under 500)	(500 to 10,000)	(Above 10,000)	Total
South Carolina	61	18	7	86
Georgia	150	29	4	183
Alabama	75	24	6	105
Mississippi	90	14	2	106

Mr. Jordan said to water works managers that the responsibility for securing needed water supply improvements and fostering new systems in neighboring cities was theirs. To the "Ambassadors of Commerce" he said that the "Blue Print Now!" program had been effectively launched, and that representatives of manufacturers could *now* well take an important strategic part in the program by selling municipal administrations on the idea of "doing things" rather than doing some wishful thinking while believing that there might possibly be a federal government handout to encourage water and sewage works construction.

Mr. Jordan having said that local government would be expected to do its own financing, Linn Enslow raised a point by saying that there had been some talk from Washington to the effect that municipalities would not receive Federal aid in postwar public works construction; but that secretly many mayors were of a different mind and, hopeful that something in the nature of W.P.A. or P.W.A. would develop, had been holding back on any honest-to-goodness moves in getting to the "Blue Print Now!" stage. What was the best answer to those who argue that Federal aid is proper and that they preferred to assist developments in this direction?

Mr. Jordan used as the only authoritative statement to date that of Senator Lanaham who had said that there would be no Federal funds put into municipal improvements.

[Is Mr. Lanaham's word sufficient? That remains to be seen; but, how much more positive and detonating to the "Blue Print Now!" program it would be if we or Mr. Jordan could have said that Mr. Lanaham's statement had been authorized by the President. Certainly the same question, "What of future Federal aid?" has been put to the President. If so, and there has been a confirmation of the Lanaham statement, why are municipal administrations marking time and expectantly waiting for the Federal assistance which many mayors claim to be basically proper and in numerous cases necessary if an adequate stop-gap re-employment program is to result through public facilities construction.—L. H. E.]

"W.P.B.'s Policy Regarding Future Water Supply Developments" was outlined by W. L. Picton, Regional Engr., Water Division of W.P.B., Washington.

Since Mr. Picton presented nothing new that has not already been reported in previous issues of WATER WORKS AND SEWERAGE, we will not take space for the repetition. Mr. Picton did emphasize the decision that

R. B. Simms Supt. Water & Sew'ge Spartanburg, S. C. | *"Bill" Houston W. D. Taulman Associates Atlanta* | *"Paul" Chorney Staff Sgt. Air Base Charleston, S. C.* | *E. D. Fry Supt. Sewage Treatment Greenville, S. C.* | *John Perryman Sales Engr. R. D. Cole Co. Newnan Ga.*

there would be no easing of W.P.B. utility orders until after the invasion had progressed adequately well. In the meantime, however, there were ample materials allocated for proper maintenance and repair. He issued a plea that water authorities not allow maintenance to lag behind to the extent that records show has been the case during the past 2 years.

[Since Mr. Picton's statement W.P.B. has gotten some needed bronze released for meter case production. And, now, where elevated storage is of sufficient immediate importance, steel or wrought-iron for tank construction can be had. The case, however, has to be a good one to yet secure an elevated tank. It can be predicted that in the not distant future there will be a material easing of materials and equipment for public utilities. Even now pumps can be had without too much difficulty.—L. H. E.]

"Meters—Otherwise Known as the Great American Cash Register," by Charles Bachmann, manager, Engineering Dept., Neptune Meters, New York City.

Mr. Bachmann's paper discussed the important matter of meter testing, with emphasis on the really practical considerations. First he dispelled any notion that meter testing with the use of the multiple meter test bench is in any way less accurate than the single meter test, and that multiple testing is the modern economical method. Further, that volumetric tests are just as accurate as the weighing test and simpler by far.

In meter testing it is plain common sense to aim for the greatest registration accuracy in the zone of flow rates at which the customer most prevalently draws the water. As the result of studies made by four different water utilities on properties served by ⅝ in. meters, of the total registration the following was the record of per cent of the total usage at the flow rates indicated:

Rates	% of Total
1 gal./min (and under)	24
1 to 5 gals./min.	55
Under 12 gals./min.	98.8

From these figures Mr. Bachmann pointed out the evident fact that meter accuracy at rates above 12 gals./min. is relatively unimportant. On the other hand, accuracy on the lowest flows through ⅝ in. meters meant a great deal. In fact, this consideration is the cause of the increasing desire by water works managers for the most sensitive meters and the policy of a degree of maintenance which will insure accuracy at rates of less than 1 gal./min. Furthermore, in order to account for the appreciable volume which leaves the system at the household drip and leakage rates of 1 quart/min. and under, and the failure to collect any money for this unaccounted-for water, it is important to install meters which will continue to operate and register this low flow rate long after the meter is new.

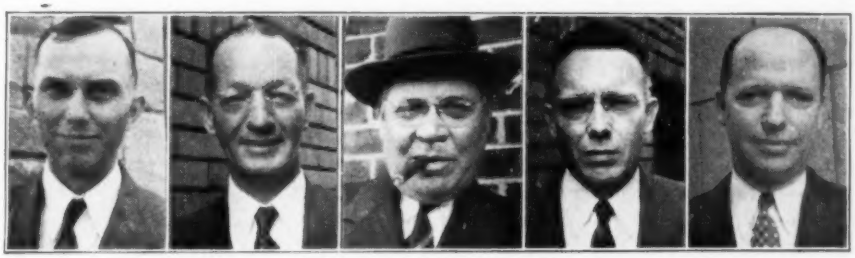
As to shop practices and tools, Mr. Bachmann said that no prescribed rules or manual on meter repair and maintenance methods could possibly take the place of mechanical ability, conscientiousness, and experience of the man at the bench. One suggestion that he would make was that new meters be taken apart and studied carefully with particular emphasis on the clearances provided by the manufacturer. What the repair man should aim for is a completed job which returns the old meter to as nearly as practicable the same condition as a new meter. That is why a new meter should be constantly studied.

Concerning the period of service permissible between testing and overhauling, this was something on which no one can be positive until a sufficient number of tests are made with known sensitive and accurate meters placed in series with representative in-service meters and a comparison of sensitivity and accuracy on the more important flow rates is obtained. Some state regulatory bodies require replacement of meters at 5-year intervals. This, however, may prove sufficient for average circumstances; whereas the time may be shorter or longer under specific conditions. Only the checkup can answer this question.

The New U.S.P.H.S. Standards

Almost an entire session was devoted to a free for all discussion of the new "U.S.P.H.S. Standards for Drinking Water" concerning which objections have been filed by the Am. Water Works Assn. as being impossible of fulfillment in the great majority of cases. His objection is chiefly aimed at the requirements pertaining to the existence of potential hazards to water quality on the premises of the water taker—beyond the point of the water utilities' legal responsibility, or where the water passes from the utility owned pipes into customer owned pipes.

B. P. Rice, Supervising Engr., R.F.C., Atlanta, introduced the topic for discussion by the several representatives of State Health Departments in prepared statements, and these were followed by open floor discussion.



Bartley Cash Asst. Supt. Water & Sew'ge Newman, Ga. | *T. A. Jones Supt. Utilities Fort Valley, Ga.* | *A. T. Clark Manager W & S. Mfrs. Assn. New York* | *N. M. deJarnette Engineer Ga. Dept. of Health Atlanta* | *Geo. W. Kelsey Gen. Sales Mgr. Builders of Providence*

Mr. Rice felt that the new U.S.P.H.S. Standards placed too little emphasis on the physical survey of conditions of the supply and overemphasized the bacterial records, number of samples, etc. Naturally, compliance with the standards in the requirement of known freedom from plumbing cross connections on the interior of buildings was an impossible standard to meet on any practical basis for the present. What is needed, however, is a more rigid

checking and regulation of water handling at filling points on the public carrier's property.

Dan F. Frick, Chief Engr., S. C. State Dept. of Health, pointed out that water works operators needed to be more adequately informed concerning requirements in the new U. S. Standards. It was true that the State of South Carolina was not equipped in manpower nor facilities to carry on the new sampling schedules and examinations. He felt that if we took it a bit easy, eventually much of the new standards could be met by water authorities—but, he has felt that the impositions on the water utility were not tenable as long as more effective control of water handling by public carriers was not an accomplishment.

N. M. De Jarnette, Chief of Laboratory and Acting State Sanitary Engr., Ga. State Dept. of Health, considered cross-connections as much the responsibility of the water utility as of the health agencies or other regulatory bodies. Georgia did not consider the number of samples required as being too many. The results of approved laboratories (private or in the plants) were accepted by the State in Georgia. The State, however, examines not less than 3 samples each month from even the smallest public supplies. He considered the new Standards something to work toward without expectation of meeting the requirements immediately, since discretion and judgment would be used in any event rather than the exact letter of any standard.

Arthur N. Beck, representing the Alabama Dept. of Health, presented one of the best reasoned out statements that we have heard concerning the new U.S.P.H.S. Standards. With 247 public supplies the new sampling schedule can't yet be met by the State. In Alabama the standards must be met by filtered water before chlorinaton. He did not discuss the plumbing connection hazard because of insufficient grounds, but reported that Alabama would do its part as far as practicable and go along recommending for or against certification based on past practice, since this had appeared adequate on epidemiological grounds during past years. Alabama agreed that more attention should be given general conditions on the distribution system. In Alabama only 9 of 62 water handling facilities of the common carriers could be considered satisfactory. The new Standards had not placed the deserved emphasis on watering point conditions, while seeking to perfect the product delivered to these stations.

Harry E. Jordan was at this point asked to review the progress made by the special committee of A.W.W.A. charged with securing a general review and revamping of the Standards by the U.S.P.H.S. Mr. Jordan, in a carefully worded detailed manner, took the audience through the history and the hearings in Washington which resulted from the appeal of the A.W.W.A. Board. These Standards were developed with the guidance of an advisory committee composed of representatives from all interested associations. Somehow the committee had not seen the implications of the requirements pertaining to plumbing connections—had been overly laboratory minded and overlooked the physical-mechanical aspects of the Standards. From the first, however, A.W.W.A. has objected to the tie-in of the Manual on Design and Operation with the Official Standards—i.e., even binding them together, although the Public Health Service considers the Manual only as a guide.

The A.W.W.A. Committee on Standards Review believes that Section 1.6 is the most objectionable item in the Standards. Leading State Sanitary Engineers agree that it can't be met under present-day circumstances and therefore is untenable. This is the section which requires the evaluation of certification quality at the tap of the customer *regardless* of quality at the customer's connection to the public water main or at any other point. As to sampling frequency, the strict adherence to the printed schedule is a practical impossibility, according to the A.W.W.A. Committee. State Health Dept. discretion should be permitted on sampling schedules is claimed, and the schedule rightly belongs in the Manual.

As to the physical standards the committee contends that color, taste, odor, and iron, cannot be considered as disqualifying effects because no physiological significance can be attached thereto.

Mr. Jordan felt that much good had come from the Washington Conference with U.S.P.H.S. officials (Dr. Draper presiding) and admitted the interconnection specifications are ideals to be met as proves possible, but do not belong in the Standards as such. The committee is urging introduction of greater discretionary opinions of the State Health Agencies in ultimate certification of public supplies. Present indications are that the Public Health Service wishes to set the ideals high but, at the same time, revise the Standards to a basis of practicability. While certain factions are adamant the ablest executives in the Public Health Service are open to arguments, and revisions can be expected in Mr. Jordan's opinion.

Speaking for the Public Health Service, *Major McDonald,* U.S.P.H.S., New Orleans, said that the Standards were purposely idealistic for the present in some respects, but that interpretations were to be permitted the State Sanitary Engineers as had always been the case in the past. The service had never questioned the ability of the State Engineers to render opinions for or against certification, and this history should be reassuring in the present situation where perhaps the word *shall* had been used too commonly when *should* is the less stringent and adequate term.

Elected President Publishers' Association

E. Scranton Gillette, Vice President and General Manager of the Gillette Publishing Co. of Chicago and New York, was recently elected President of the Business Papers Publishers Association of Chicago.

Mr. Gillette has long been an active member of this Association, as he also has of the Associated Business Papers, Inc., which is a national association of the leading business paper publishers in America.

E. S. Gillette

Inasmuch as we are constantly publishing items concerning honors bestowed upon our friends, we feel that we have the right to take the space here to tell about this honor which has come to the boss.

THE "MUD-HOG"

Otherwise, an Air-Lift Subaqueous Trencher Which May Also Be Used for Handling Sludges, Sand and the Like

By HARRY U. FULLER
Chief Engineer
THE PORTLAND WATER DISTRICT
PORTLAND, MAINE

The Author

BECAUSE of war conditions in Portland, Maine, in 1943 it became necessary to devise a method of digging a trench 500 feet long in 30 feet of water without the use of the customary bucket on a derrick.

The material in the harbor bottom is a plastic blue clay and the method adopted was to cut the clay with water jets and remove it by air-lift of the heavy clay suspension.

The Air-Lift

The principle of the air-lift pump is that a column of water in a vertical pipe when full of air bubbles is lighter than the water on the outside of the pipe, and the unbalanced force causes the column of air-water mixture in the pipe to rise as long as air is forced into the pipe.

On page 146 of the Reference and Data Section in "Water Works and Sewerage" for May, 1937, the principle of pumping by air-lift is effectively explained in detail.

The air-lift trencher has two elements—the water jets and the air-lift pump. These were built into one unit, which could be easily handled and suspended from the boom of a lighter.

Construction of Trencher

The air-lift trencher (see cut) consisted of lengths of 8" pipe screwed together, reaching from the harbor bottom to a few feet above the deck of the lighter, about 40 feet.

On the upper end was an 8" quarter bend with a three-foot piece of 8" pipe screwed into it to throw the mud away from the lighter. The lower section of the 8" pipe was five feet long and around it, 6" from the bottom, was welded a 16" steel drum 8" high. The drum was sealed top and bottom with ring plates. A 2" air pipe was attached to the drum through the top ring plate.

Through the pipe within the drum were five equally spaced 11/16" holes for admission of air from the drum to the lift pipe.

On the other side of the 8" lift pipe was the 3" water jet pipe with 1" tees at 8" intervals. Into each tee was screwed a one-inch ⅛th bend and into the bend a 4" long nipple, flattened at the outer end to leave ¼" wide opening to produce flat cutting jets.

The water pipe was carried by fittings around the 8" pipe under the drum with three jets pointing downward. The three pipes, from the lower section to the top of the trencher, were held together by welded braces.

Sizes and Proportions

The dimensions of the trencher were taken from an article in the "Engineering News Record" of June 5, 1941, telling how J. Rich Steers, Inc., used an air lift for cleaning mud and sand out of cofferdams.

The same proportions found to work successfully in the 12" air lift in New York were used in building the tools herein described.

The areas of the air ports and air drums and the capacity of the air compressors were thus proportioned to the area of the air-lift pipes used on the Portland trenchers.

Three of these air-lift trenchers were built: An 8" pipe with 11/16" air ports inside the drum, requiring 400 cu. ft. of free air per minute. A 5" pipe with 7/16" air ports, requiring 150 cu. ft. of free air per minute. A 4" pipe with ⅜" air ports, requiring 100 cu. ft. of free air per minute.

All three units worked very well with one-third less air than called for in the article referred to. However, with the full amount of air called for they worked much better.

When the proper amount of air is being applied, the flow is steady. If irregular flow or surging develops the amount of air must be readjusted.

One outstanding advantage of this type of equipment for pumping mud,

sludge, grit, etc., is the smooth interior water way which permits anything which enters the lower end to continue to the outlet unobstructed.

Method of Use

The trencher was hung from the side derrick boom on the lighter. Gasoline-driven air compressors of the required capacity were placed on the deck of the lighter and connected to the upper end of the 2" air pipe with air hose.

To provide water for the jets, a gasoline-driven fire pump, with a capacity of 500 gallons per minute at 100 pounds pressure, was also placed on the deck of the lighter and connected through fire hose to the upper end of the 3" water pipe. Because of the liberal diameter of the water pipe running to the foot of the trencher a large part of the 100 pounds pressure at the pump was available at the cutting and stirring jets.

The horizontal and vertical angles of the jets should be adjusted to give the required width of trench and to cut off the face of the clay and not merely bore holes in it.

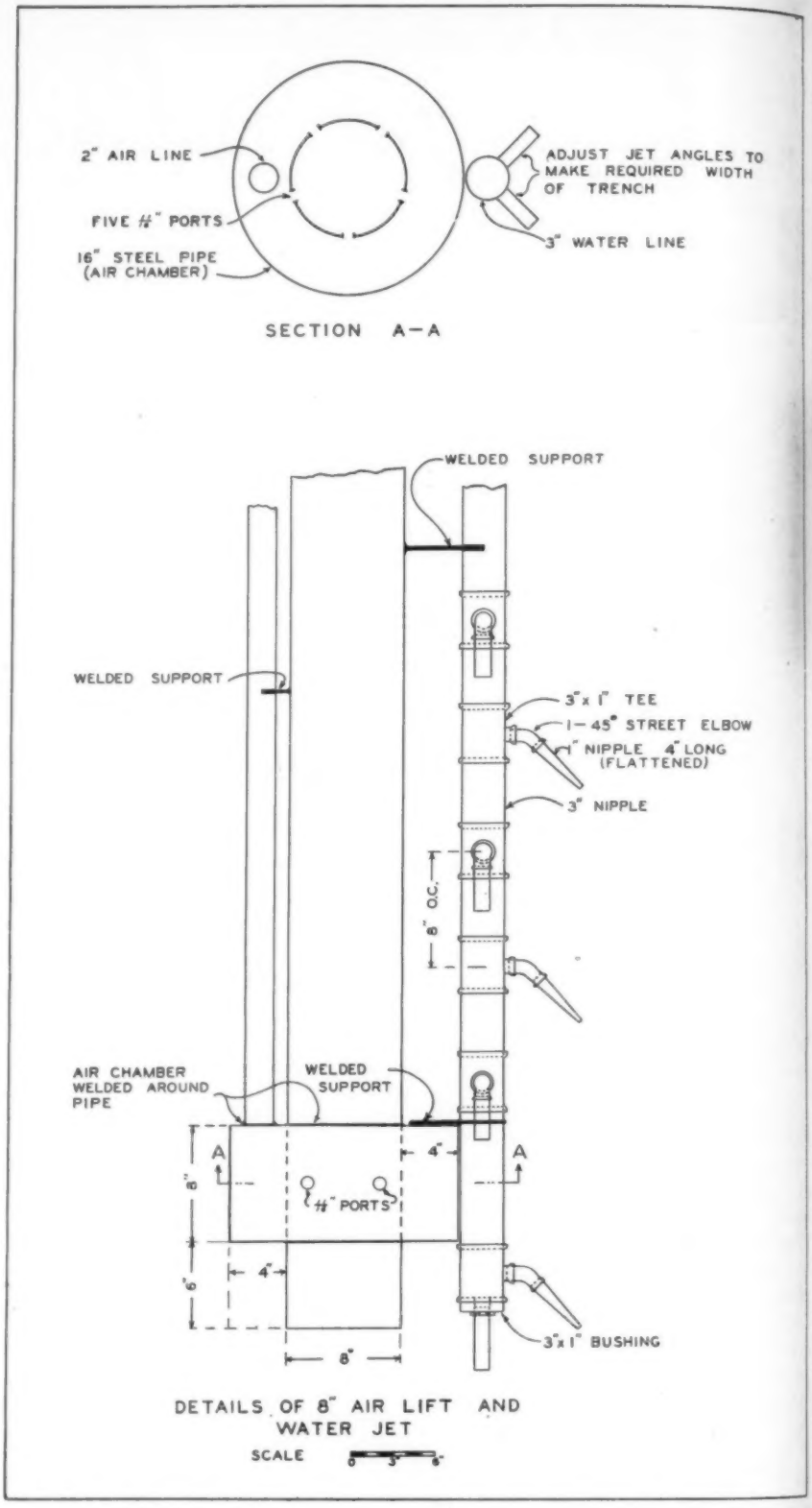
It was found to be helpful to keep the trencher constantly moving up and down a few inches. This was probably because the jets were some inches apart.

The rate of trenching varied with the quality of the material. In medium soft clay the speed reached 25 feet per hour of actual digging and the trench on the harbor bottom was about three feet wide at the top.

Other Possible Applications

It is believed that an air-lift device of this type will have a variety of uses in water and sewage works practice in addition to trenching. For instance, these units might be used for lifting (and at the same time washing) sand and small gravel. A small unit may be used for removing sand from rapid sand filters and transferring it from one unit to another. It could be used in excavating, desludging basins or lagoons.

In sewage it could be used to transfer sludge, lift and wash grit, de-sludge tanks or lagoons, and like uses. The units are readily portable, with a short riser and air pipe subject to extension to any desired length through use of plain end pipe lengths—and gasketted flexible couplings.



Detailed Sketch of the 8-in. P.W.D. Air-Lift Trencher

OHIO SECTION'S SIXTH ANNUAL CONFERENCE

Record Registration and Information Please Meeting Highspots

BREAKING all attendance records with a registration of 240 (membership 229) the Ohio Section's Sixth Annual Conference on Water Works Management at Columbus, May 18 and 19, was a huge success. From its beginning with a discussion of small water works problems to its conclusion by a well conducted Information Please session, with Wendell R. La Due, Supt. and Chief Engineer, Bureau of Water and Sewerage, Akron, as Master of Ceremonies, the meeting drew lively interest.

Chairmen

Incoming
Carl A. Eberling
Supt. of Water
Cincinnati, O.

Outgoing
Harvey P. Jones
Cons. Engr.
Toledo, O.

Business Meeting

The slate of officers presented by the nominating committee headed by F. P. Fischer, Sales Engineer, Wallace and Tiernan Co., Cleveland, was unanimously elected and the new officers are:

Chairman—Carl A. Eberling, Supt. of Water, Cincinnati.

Vice Chair.—L. T. Fawcett, Secy. and Chief Engr., Mahoning Valley San. Dist., Youngstown.

Secy.-Treas.—L. J. Hoffman, Office Mgr., Water Dept., Akron.

Trustee—Thomas R. Lathrop, San. Engr., Ohio Dept. of Health, Columbus.

(Wallace W. Moorehouse, Director, Dept. of Water, Dayton, Ohio, represents the Ohio Section on the AWWA Board.)

Fuller Award

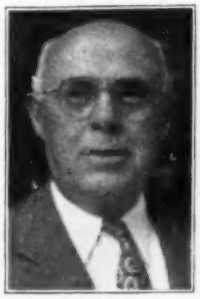
At the annual banquet, in addition to some well presented entertainment and a short after-dinner talk by Prof. Alex Laurie of the Horticulture Dept. of Ohio University, the Fuller Award Committee announced its selection of the Awardee for 1944.

The announcement was made by Wendell R. LaDue, president of the Society of Fuller Awardees, as follows: "To Philip Burgess, who since 1911 has by his personal initiative as an engineer, his faithful stewardship in public appointments, his unselfish contributions in association committee work and his conscientious attitude toward his clients has upheld the ideals of the waterworks profession."

Operation Problems of the Small Water Plant

(Conducted and Reported by Thos. R. Lathrop, San. Engr., Ohio Dept. of Health.) Questions had been sent in advance to various persons, but most of the answers were extemporaneous. Some of the dozen or so questions were:

Q. "How can filter sand in a lime softening plant be kept free-running and prevented from cementing together?"—A. Washing with the aid of a Palmer surface washer has prevented this trouble in at least one plant.



Vice Chairmen Fuller Award

L. T. Fawcett
Secy. & Chief Engr.
Mahoning Valley San. Dist.
Youngstown, O.

Phillip Burgess
Cons. Engr.
Columbus. O.

Q. "What can be done to eliminate or prevent cross connections between the municipal supply and private domestic supplies, such as wells and cisterns?"—A. Soften the municipal supply and the private domestic supplies will disappear.

Q. "How can residual chlorine be maintained on the fringe of the distribution system?"—A. Satisfactory results are being obtained by means of break-point chlorination. Ammonia-chlorination also helps and is particularly effective following break-point chlorination.

Q. "What can be done to prevent corrosion of pipes carrying Calgon solution?" — A. Calgon solution should be treated with soda to raise the pH about 8.8. Use about one lb. soda to nine lb. Calgon.

Q. "What is the best method of protecting against corrosion on the inside of an elevated tank and riser?" —A. There are arguments both for painting and for cathodic protection.

Water Supply Planning— Good, Bad and Indifferent

From a 12 months' study of every water supply in Ohio, F. H. Waring, Chief Engr., Ohio Dept. of Health, cited some examples of good, bad, and indifferent municipal water supply planning. Wooden mains, disintegrating concrete basins, and causing an increase in iron and hardness content by overdraft, represented bad planning.

Indifference was obvious in the purchase of a supply by a municipality without adequate beforehand engineering appraisal of the property or equipment. Good planning results in allowance for future expansion and extensions, provision for silting of reservoirs, and discarding a water supply of high hardness for a softer supply.

The Ohio Water Supply Board

Mr. David H. Harker, Engr. and Chief of Staff, Ohio Water Supply Board, described its work, in studying the water supply situation in the state. Following are excerpts from his talk: "There is nothing monotonous about the occurrence of ground water in Ohio. It varies over the

Secy.-Treas.
L. J. Hoffman
Office Manager
Water Dept.
Akron, O.

Info. Please M. C.
Wendell R. LaDue
Chief Engr. & Supt.
Bur. Water & Sew.
Akron, O.

T. R. Lathrop
San. Engr.
State Health Dept.
Columbus, O.
(Trustee-Elect)

F. W. Weed
Regional Engr.
War Prod. Bd.
Washington, D. C.

F. H. Waring
Chief Engr.
State Health Dept.
Columbus, O.

Robert Sheen
Engineer
W. H. & L. D. Betz
Philadelphia, Pa.

Program Participants

state between counties, within the limits of a town and often across the road. The variation is due in part to climatological factors but more particularly to geologic features. . . . Certain aquifers which are productive in some parts of the state cannot be depended on in other parts where they are much deeper, because the depth usually carries with it salt, sulphur, or other highly mineralized waters. . . . Glaciation is one of the principal features in the occurrence of ground water. . . . Throughout the glaciated part are numerous old buried valley channels. Some are filled with good water bearing materials. . . ."

Surface Water Resources

Surface waters are being studied in Ohio by the U. S. Geological Survey under the direction of C. V. Youngquist, Dist. Engr., Water Resources Branch, U.S.G.S., who reported that 150 gaging stations now exist.

Low annual precipitation (26.6-in.) in 1934 was the lowest since 1883, although reports indicate even less rainfall in 1823. Tree ring studies show a long drought period between 1798 and 1821.

The importance of knowing how much water is available from run-off to streams becomes more apparent during wartime, when war industries consume such tremendous quantities of water. Mr. Youngquist said Ohio's industrial water consumption could be measured only in billions.

Water Works Supts. and Water Works Peddlers

In two anonymous papers read by the secretary, L. J. Hoffman, the Water Works Superintendent took a look at the Salesmen and vice versa. Written in humorous vein the papers nevertheless conveyed the pet peeves each have against the other.

Salesmen don't like to be given the brush-off or the run-around; appreciate being told when the boss will be back if he is not in the office; don't like to have their product discussed in front of strangers; don't like to be kidded about competitors' prices; dislike compliments unless they are meant; want letters to give details when asking for service; and like to have letters immediately if some question arises instead of having the Supt. wait several weeks until the next call to tell about a difficulty.

Superintendents don't like to have salesmen prolong a call when it is obvious the supt. is busy; like sincere praise but not flattery; dislike overselling; object to salesmen who mis-

Programmers in Action

S. F. Newkirk, Jr.
Supt. Bd. Water Com.
Elizabeth, N. J.
(Pres. A.W.W.A.)

W. W. Morehouse
Supt. of Water
Dayton, O.
(A.W.W.A. Dir.)

A. E. Griffin
Wallace & Tiernan
Newark, N. J.

Sixth Annual Ohio Section Conference

What Goes on Inside the Hall

Two Technical Sessions with Some Entertainment Between

take courtesy for license; practically hate salesmen who act like the office belongs to the 'peddler'; don't like salesmen who become confidential or gossipy; and object to being told about the salesman's competitor.

3.75% of the Registrants

Ira Bready, Permutit Co., Cincinnati, O.

H. M. Olson, Ohio Salt Co., Pittsburgh, Pa.

R. J. Steins, Ohio Salt Co., Norwood, O.

Ira Hoover, Supt. of Water, Montpelier, O.

Ray Erion, Supt of Water, Milford, O.

Hayes Kuhns, Leadite Co., Killbuck, O.

M. F. Hoffman, Commercial Supt., Water Dept., Cincinnati, O.

Carl Brown, U. S. Pipe and Foundry Co., Chicago, Ill.

F. P. Fischer, Wallace & Tiernan, Cleveland, O.

Lime-Soda Softening Sludge Disposal

Describing the lime-soda softening plant at the Wright Aeronautical Corp. in Cincinnati, Robert Sheen of W. H. and L. D. Betz, Philadelphia, told of the application of selective calcium softening and the recovery of calcium carbonate from the sludge by use of Bird centrifuges and flash dryers. With well supplies varying in hardness but averaging about 300 ppm. it was necessary to soften the water and the above system proved the most economical.

Mr. Sheen showed pictures of several installations; among them the experimental plant of the Columbia Steel plant, where it appears that calcining of the recovered calcium carbonate will be more economical. (A more complete report on recovery of lime sludges will appear in the report on the Milwaukee meeting of AWWA.)

AWWA, Blueprint Now, and WPB

The state of AWWA was reported to the conference by S. F. Newkirk, Jr., Vice-President of AWWA, who stated that, for each dollar dues, the association is now spending about two dollars in carrying out its work for the membership.

The Ohio Water Works men were urged to *"Blueprint Now!"* by E. L. Filby, Field Dir. of the Comm. for Water Works and Sewerage Development. Mr. Filby has been taking the message to men in the field for the past ten months and the Ohio Section was as interested as other groups have been.

on Water Works Management

Manufacturers' Representatives

E. A. Sigworth, Ind. Chem. Sales, New York, N. Y. | *R. R. Weber, Mathieson Alkali Wks., Cincinnati, O.* | *Jim Brown, Nat. Water Main Clean. Co., Chicago, Ill.* | *H. R. Hay, Phila. Quartz Co., Philadelphia, Pa.* | *Jim Nicklis, Wallace & Tiernan, Columbus, O.*

"Plant Management and Water Conservation" was the topic presented by F. H. Weed, Regional Engineer of WPB. This was the same story presented at the Illinois and Indiana Sections, reported in our May issue.

Distribution Records

Mr. Russell S. Banks, Manager Ohio Water Service Co., Marysville, pointed out that when the only records are in the mind of some employee, then trouble can happen and often does. To prevent such trouble Mr. Banks designed a series of records for the distribution system. Using a loose leaf visible index type of card and making notations in reference to permanent landmarks, as well as other pertinent data, a complete record on hydrants and valves is now available.

Design of Steam Power Plants

Mr. S. C. Simmermacher, Chief of Power Plants, Div. of Water and Heat, Cleveland, said the "Trend in the Design of Steam Power Plants" was toward electrification. Several reasons for this included simplification, complication of high pressure steam plants, decrease in skilled engineers, shortage of technical men in the field of steam engine pumping, the good job of electrification by the electrical utilities, the low salaries offered steam engineers and the lack of advancement for men in that work.

Mr. Simmermacher also discussed the practices in the past, the advantages and disadvantages of changes and combinations of plants, and made a few predictions for the future. W. T. Birch of Chicago, an old friend of steam pumping engines, said that centrifugal pumps could not compete economically with steam pumping engines. Centrifugal pumps require standby equipment and have other disadvantages in competing with steam. In closing his remarks Mr. Birch said, "Anyone looking for a good crank and flywheel pump ask me, for I know where the suckers are that are throwing them away."

Effect of War on Toledo's Water Works

In the absence of R. W. Furman, Commissioner, who remained in Toledo because of a strike of employees, Edward R. Barrett, Office Manager, led the presentation on Toledo's problems. City manager form of government in Toledo has resulted in reduced employee numbers, increased efficiency, and resulted in financial savings.

Mr. Ernest Townsend, Chief Inspector, told of a study of tap size resulting in savings by not installing large services where only small ones were needed. During the last three years, a leak detector has saved considerable expense by eliminating unnecessary excavations and reducing water wastage.

Toledo meter reading problems were recited by Joseph Jankowski, Chief Meter Reader. Where entrance to premises is not possible, it has been found inadvisable to estimate the consumption for more than two quarterly periods. When the owner does not respond to a card asking access, a bill for five times the amount is rendered. No adjustment of the bill is made until a satisfactory entrance and reading are obtained.

Breakpoint Chlorination Control

By means of a diagram A. E. Griffin, Tech. Service Div. of Wallace and Tiernan, Newark, N. J., explained how break-point chlorination can be easily and accurately controlled. This control depends solely on the ortho-tolidine test. Where no false residuals are obtained, a flash color reading of ortho-tolidine (i.e., in ten seconds or less) indicates "free" or active chlorine; whereas, the color produced after five minutes represents the summation of free and chloramine residuals. The difference between the two readings for all practical purposes may be considered the chloramine residual.

By the diagram it was shown that the free chlorine residual begins to appear as the chloramine residual begins to drop toward the breakpoint. At the breakpoint the residual chlorine is half free or active, and half chloramine. After the breakpoint has been passed, any point beyond which the active chlorine is 85 per cent of the total residual, assures that effective break-point chlorination control has been reached. Thus this double observation offers an easy and simple control.

Where false residuals are suspected, Mr. Griffn recommends the use of the Hallinan arsenite test which may be combined with the flash test for the break-point chlorination control, and for accurate differentiation between active chlorine and chloramine residuals below 1 ppm. Mr. Griffin also recommends the procedure of Hallinan be followed.

Information Please

Sparked by Wendell ("Clifton Fadiman") La Due a most successful "Information Please" session concluded the program. Five technical experts and their specialties included T. B. Henry, Cons. Engr., Toledo—Supply; E. B. Evans, Supt. of Purification, Cincinnati — Treatment; S. C. Simmermacher, Chief of Power, Cleveland—Pumping; A. A. Ulrich, Manager of Water, Massillon—Distribution; and L. J. Hoffman, Off. Mgr., Akron—Collection. Members of the audience also participated.

Answers to a number of the questions submitted in advance included the following: The main differences between anthrafilt and sand is in specific gravity as well as chemical composition but the latter has no effect on the water.—Coarser activated carbon particles may shorten filter runs more than the finer particles.—The main advantage of cone type valves is a lower loss of head.—Total hardness does not necessarily have any relation to the plugging of well screens.—Bills for large leaks should be collected if registered on the meters, except on invisible or underground leakage and then to the amount of half the bill. — Palmer Filter Sweeps have been found to eliminate mud-balls and other troubles in filtration.—Small water plants should have standby chlorinating equipment.

The growth of the Ohio Section from 83 to 229 in six years was remarked on by Sam Newkirk, AWWA President, whereupon Hayes Kuhns, membership chairman was quick to state that he had enough applications to bring the membership to over 250. (G. E .S.)

VISCOSE RAYON MANUFACTURING WASTES AND THEIR TREATMENT

Part I—The Manufacturing Process and Wastes Reduction at the Source

By E. T. ROETMAN
Sanitary Engineer
AMERICAN VISCOSE CORPORATION
MARCUS HOOK, PA.

Part II of this article deals with Waste and Sewage Treatment. It will appear in the next issue.

RAYON is made of regenerated or refined cellulose. The manufacturing process consists of removing impurities from the raw material and changing the physical form of the alpha cellulose of the wood pulp or cotton linters into rayon threads. To accomplish this, the manufacturer must not only remove the impurities but also change the chemical form before he changes the physical form. The pulp is first converted into cellulose xanthate which is dissolved in dilute caustic soda to form the spinning solution called viscose. The viscose solution is extruded through orifices of suitable design into a chemical bath which coagulates and fixes it into the desired solid form. Several chemicals are used in the manufacturing process but they do not remain in the finished product.

Raw Materials Used

The two basic raw materials used are wood pulp and cotton linters. The pulp best suited for rayon comes from spruce or hemlock logs and contains 88% to 92% alpha cellulose. The cotton linters contain 98% alpha cellulose.

The chemicals used in the greatest quantities are caustic soda, carbon bisulphide and sulphuric acid. Other chemicals are corn sugar, nitre cake, glaubers salt, zinc sulphate, sodium sulphite, bleaching compounds and some titanium oxide.

The manufacture of one pound of yarn requires 1.15 to 1.25 pounds of wood pulp and cotton linters, 1.4 pounds of caustic soda, 0.35 pounds of carbon bisulphide, 1.7 to 1.9 pounds of sulphuric acid, 0.5 pounds of corn sugar and about 0.4 pounds of other chemicals. A rough idea of the amount of chemicals used each year can be secured by multiplying the above figures with the annual production of 633,000,000 pounds of viscose rayon.

The Author

Making Alkali Cellulose

The first step in the manufacturing process is steeping or mercerization. Sheets of pulp are stacked on edge in a steeping press containing a 17 to 18 per cent caustic soda solution and allowed to soak about 2 hours. The caustic solution bleaches out the hemi cellulose which is soluble but does not attack the alpha cellulose. When the batch is ready, the excess caustic solution containing the hemi cellulose and other impurities is pressed out of the sheets and sent to dialysers for purification. Formerly, the caustic solution was sewered after it reached a certain degree of contamination so its regeneration or purification as now practiced can be classed as a waste treatment process and will be described in that section of this paper.

The next step in the process is the shredding of the moist soft alkali cellulose sheets under accurate temperature control. The shredder tears up the pulp and intimately mixes the entire batch equalizing any non-uniformity of caustic content.

The shredded crumbs are then discharged into specially built steel cans and taken to a temperature controlled aging room. Here for many hours the cellulose stays while its molecular structure undergoes a change.

Xanthating the Alkali Cellulose and Making of Viscose

The fourth step is xanthation or the conversion of the alkali cellulose into cellulose xanthate. This is done by treating it with carbon bisulphide for two to three hours in a churn under exact temperature control. The aged crumbs are placed in the churn which is closed and sealed. Rotation on its horizontal axis is begun and the proper charge of carbon bisulphide is then added through a hollow trunnion. The churn is permitted to rotate slowly until the batch is done.

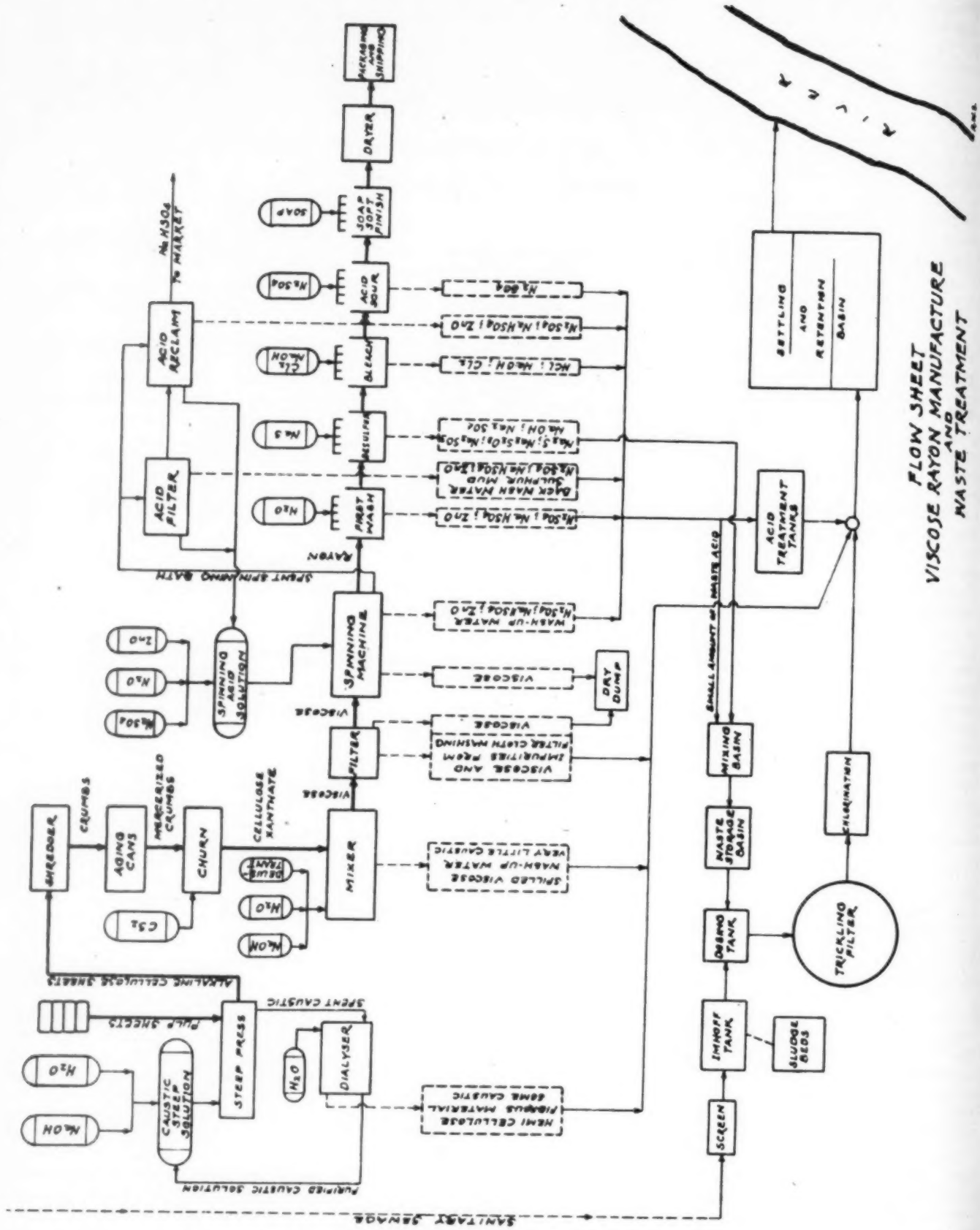
The churn is then exhausted of any excess carbon bisulphide and the batch of cellulose xanthate is placed in a brine jacketed mixer where it is dissolved in a dilute caustic soda solution under carefully controlled temperature. This solution—viscose—is a complex chemical compound containing the cellulose in a form from which rayon is spun. This solution, when spun, gives the bright shiny rayon yarn. If a dull yarn is wanted, a dulling agent or delusterant is added in the mixer. The substance found most suitable for this is titanium oxide as it has a refractive index of 2.55, the highest of any pigment.

Filtering and Maturing the Viscose

As the viscose is apt to contain some undissolved particles of cellulose or other foreign substance, it is filtered before being sent to the spinning room. This is generally done in standard plate and frame filters and the viscose is sent through three or four filters to insure perfect filtration. The viscose is then kept at exact temperatures for several days before it is ready to spin. At this stage extreme care must be taken to make sure there are no air bubbles in the liquid as these would cause breaks in the filament when spinning.

Spinning the Viscose into Thread

The eighth and major step in the process is spinning of the viscose into rayon. In spinning, the viscose



Flow Sheet Viscose Rayon Manufacture and Waste Treatment

solution is forced through jets into a spinning bath. The jets or spinnerettes are little caps of alloys of platinum perforated with very small holes. The number of holes governs the number of filaments in the thread.

The spinning bath into which the viscose is extruded is composed of water, 8 to 10 per cent sulphuric acid, 13 to 21 per cent sodium sulphate, about 1 per cent zinc sulphate and from 4 to 10 per cent corn sugar or glucose. The viscose which contains about 7 per cent cellulose and 6½ per cent caustic soda coagulates when it enters the bath solution. The neutralization of the caustic soda by the acid in the bath results in the breakdown of the cellulose xanthate and the precipitation of regenerated cellulose.

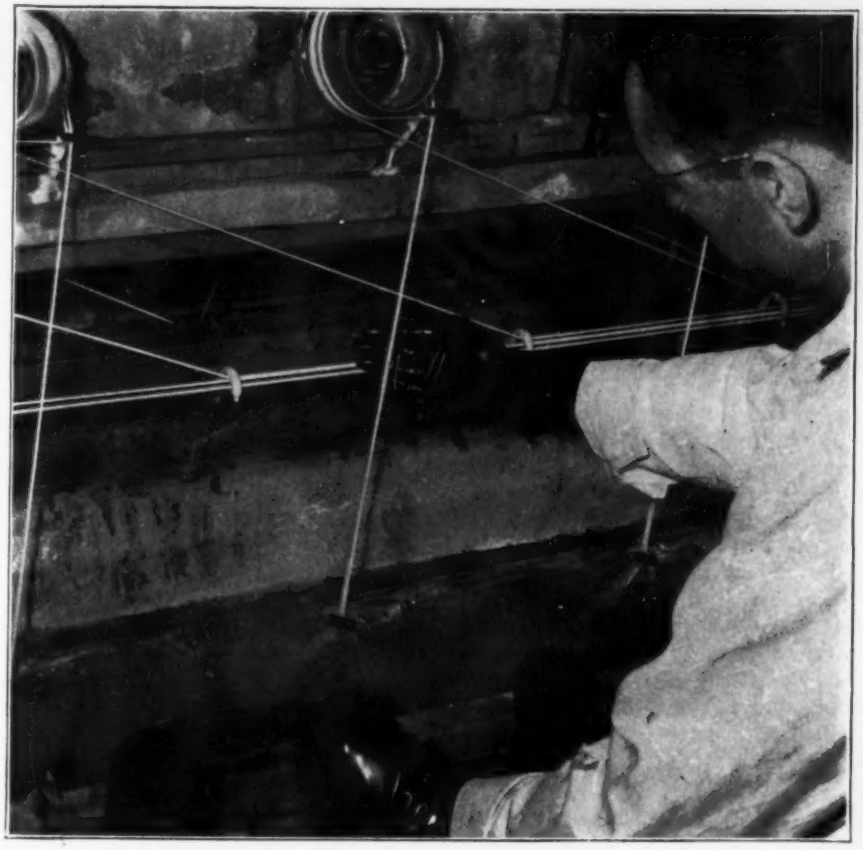
The precipitated cellulose thread is picked up and passed over a rotating glass "godet" wheel then down through a funnel into a centrifugal pot or "Topham Box." The rotation of this socalled "box" imparts the desired twist to the thread. The weight or size of the thread is not controlled by the size of the holes in the jets but by the rate at which the viscose is forced through the jet and the speed with which the thread is drawn away.

The spinning bath is continuously being "spent" or diluted with the water from the viscose, while the neutralization of the caustic soda by the sulphuric acid generates sodium bisulphate salt and other sulphur ccompounds. Formerly, the spent acid spinning bath was sent to the sewers. The reclaiming or purification of this acid bath has not only removed a tremendous pollution load from the rivers but saves the rayon industry millions of dollars a year in chemicals.

Finishing the Rayon Yarn

The yarn as it comes from the spinning machine is not finished but must be washed, desulphurized, bleached and dried. The first washing with warm water removes the spinning bath liquor which is still on the thread. This wash water is the main source of waste acid and must be treated before discharge into a river.

The next step in finishing is desulphurizing which is accomplished by passing the thread through a dilute, alkaline, sodium sulphide solution. The alkaline sulphide removes the sulphur by forming soluble polysulphides of sodium. The waste from this operation is too dilute for recovery but has a rather high B.O.D. and must be treated before discharge. After desulphurizing, the yarn is bleached with sodium hypochlorite. This may be followed by souring with a very dilute hydrochloric acid. The washing of the yarn after bleaching produces an acid waste which is mixed with other acid wastes for treatment.



Spinning Machine showing the "tow" or bundle of filaments coming from the acid bath used to coagulate the viscose solution. (Washing the acid from these filaments produces most of the acid wastes.)

Soap or soft finish may be added to the yarn after bleaching to improve softness and working properties. No wastes result from this operation unless a spill occurs or the soap or soft finish become contaminated and must be disposed of.

Viscose Rayon Manufacturing Wastes

Briefly, the wastes from a viscose rayon manufacturing plant may be divided into four main groups.

I Wastes from departments in which viscose is made.

II Wastes from the departments in which viscose is regenerated and that from preliminary washing.

III Wastes from departments where the rayon undergoes after-treatment.

IV Wastes from the receiving, shipping, maintenance and miscellaneous departments.

Wastes from the first group are alkaline and contain caustic soda and viscose from spillage, from washing up machines and from the overflow of the dialysers which also contains some hemi cellulose and other organic impurities. The filter cloth wash water is also included in this group and contains some viscose as well as caustic soda.

Wastes from the second group are acid and originate in the spinning room from spills and machine wash-up; in the acid reclaim department from filter back-wash water, leaks, spills and wash-up water; and in the processing department from the preliminary washing of the yarn. These wastes contain sulphuric acid, sodium bisulphate, sodium sulphate, zinc sulphate, glucose, some viscose, large quantities of hydrogen sulphide, carbon bisulphide and elementary sulphur in suspension plus some other salts.

The wastes in the third group contain dilute solutions of sodium polysulphides coming from the desulphurizing bath, sodium hypochlorite solution, weak mineral acid solutions, usually hydrochloric acid and occasionally sulphuric acid and very small quantities of soap solutions or oil emulsions.

The wastes from the fourth group includes sanitary sewage and the

many and various wastes such as barrels, boxes, waste paper, waste oils, ashes, etc., found at any manufacturing plant.

Waste Reduction at Source

While "spent" caustic soda recovery and "spent" acid bath reclaiming are now considered integral parts of viscose rayon manufacturing and not of waste treatment, they will be briefly discussed here as they are in reality waste treatment developments that grew up into money saving processes.

Formerly, when the caustic soda solution had picked up a certain amount of impurities, it was sewered and new solution used. The same was true of the acid bath, both were sewered and discharged into the nearest body of water. The pollution caused by these wastes was very severe but fortunately for the rivers, methods of recovery were well developed before the rayon industry reached its present size and these wastes while very strong were small in volume.

Caustic Soda Recovery

The purification and recovery of "spent" caustic soda solutions is now a major part of viscose rayon manufacturing and very little caustic soda reaches the rivers. However, at one time about one half of caustic soda used in the production of rayon was eventually sewered. In 1941, the rayon industry in the United States used over 555,000,000 pounds of caustic soda so it is easy to understand why we consider caustic recovery as a very important factor in the stream pollution abatement program. As indicated above the recovery of the "spent" caustic soda has not only removed a heavy pollution load from the rivers, but has meant a tremendous saving to the industry.

The problem of caustic soda purification is one of dialysis or the separation of caustic soda from a solution in which impurities (mainly hemi-cellulose) are present in colloidal form. The dialyser removes over 90 per cent of the dissolved hemi--cellulose.

It consists essentially of a tank containing diaphragms or membranes in the form of flat bags mounted in parallel and independent of each other, and made of especially treated cloth carefully prepared to insure long life and high purity of product. Each assembly consists of a spirally woven mattress inside a flat cloth bag, and two rigid wire frames on either side to form a sturdy construction. This provides large diffusion area for small volumes of liquor.

The dialyser operates on the principle of osmotic changes that take place between solutions of different concentrations separated by a semi-permeable membrane. Water is fed to the top of each diaphragm at a controlled rate and the impure solution is fed into the tank from the bottom. As the water passes downward it becomes progressively charged with caustic, while the rising impure liquor looses its caustic content. This process of exchange and dilution causes the soda to loose its organic impurities. The floating scum containing these impurities is skimmed off and sewered. The quantity of caustic diffusing through the membrane depends upon the time of contact, the area of dialysing surface, and the concentration differences. Experience proves that the most economical conditions of operation produce a liquid of half the original strength. However, the concentration may be increased by retarding the rate of production.

While this treatment recovers most of the caustic soda and keeps it out of the sewers, a small amount is lost in skimming off the hemi-cellulose and other impurities. These skimmings are mixed with other wastes for further treatment before being discharged into the rivers.

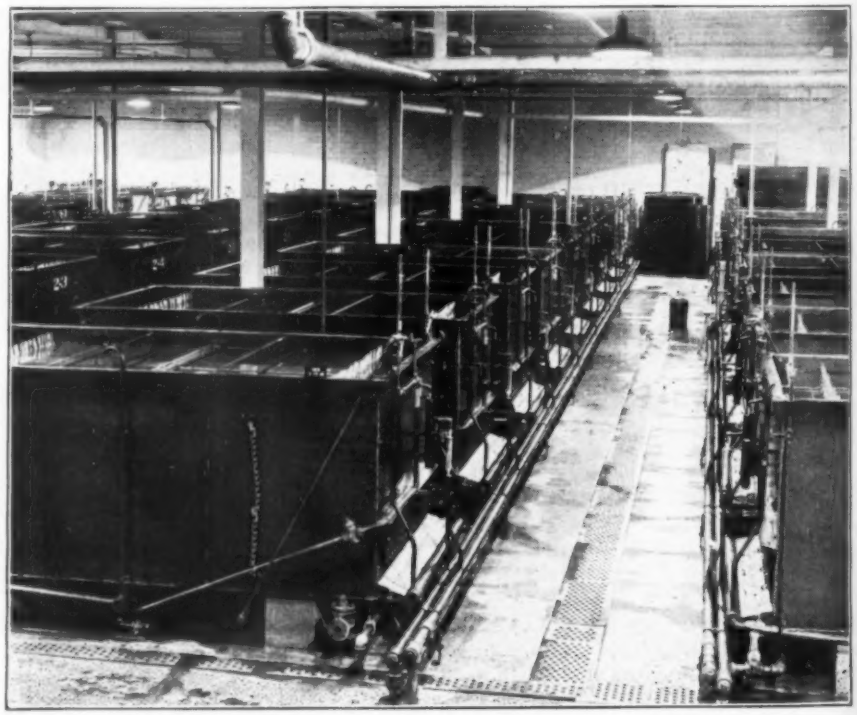
Acid Bath Recovery

The purification and re-use of the "spent" acid bath is also an important part of viscose rayon manufacturing and very little acid is now allowed to reach the sewers. The major portion of the acid that reaches the sewers is that which is washed off of the yarn after it has been spun and not from the "spent" bath as formerly, when about 1.8 gallons of "spent" acid bath was sewered for each pound of rayon made. This would amount to about 830 million pounds of sulphuric acid, 230 million pounds of sugar and 800 million pounds of sodium sulphate per year for the present rate of production.

As the viscose comes in contact with the acid bath the caustic soda is neutralized, generating sodium bisulphate and liberating the water in the viscose. Other sulphur compounds are also formed. Before being used again the bath must be reconditioned by filtration to remove the solid impurities, evaporation to remove the excess water, and crystallization to remove the excess salts.

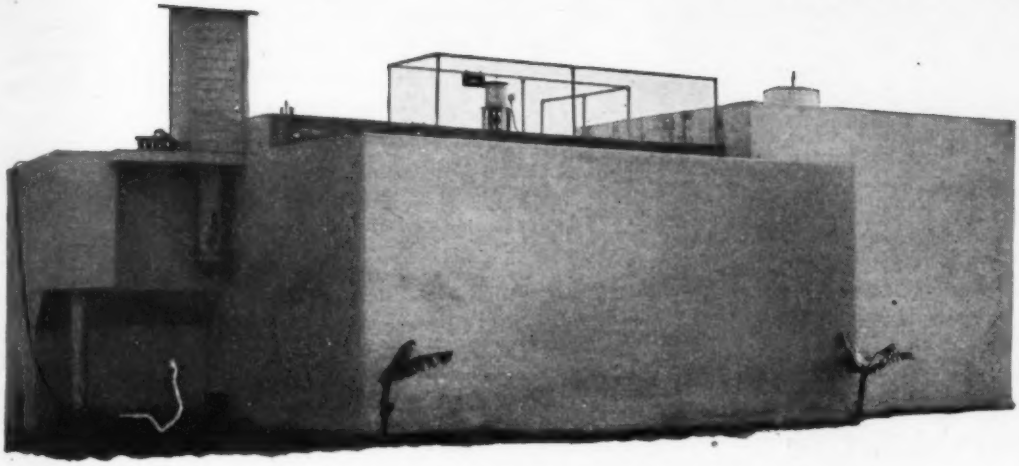
While this treatment recovers the bulk of the acid and conditions it for re-use, there still is a small amount of acid which reaches the sewers from this department. This acid waste originates in the filter backwash water, in spills, leaks and in the acid reclaim plant wash up. This waste is mixed with the other acid wastes for treatment before discharge into the river.

The disposal of wastes and sewage is described in Part II of this article.



Dialyzer Room showing tanks where "spent" soda solution is purified and recovered.

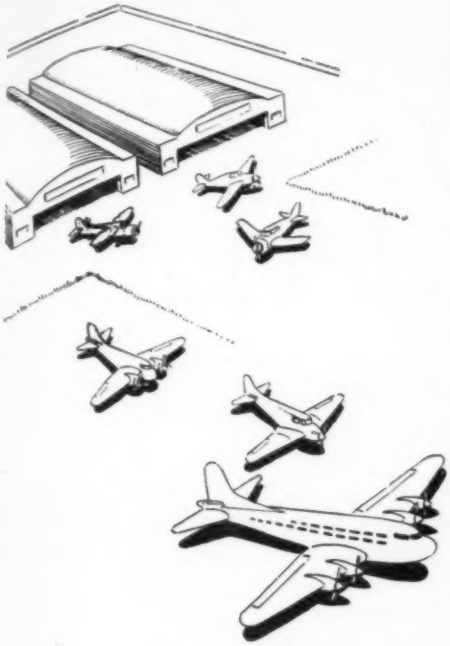
for THE AIRPORTS OF TOMORROW



Chicago "Package" Sewage Treatment Plant at an airport in Florida. It was installed above the ground because the water table was very close to the surface. Overall dimensions are 35'x45'. The above plant comprises a primary settling tank, Combination Aerator-Clarifier, digester and a pump room.

Specify

CHICAGO "PACKAGE" SEWAGE PLANTS



Chicago "Package" Sewage Treatment Plants were developed especially for populations of 100 to 3,000, which covers the range of the airports of tomorrow now being planned all over the country. They give water clear effluent at lowest cost. Purification is up to 98 per cent.

They are clean, sanitary, have no objectionable odors, no flies and no unsightly nuisances. They are simple to operate, and do not require a full-time attendant. Operator training service goes with each plant. Over a hundred such plants have been in successful operation from one to nine years.

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MEETINGS SCHEDULED:

Aug. 29—COLUMBIA, PA. (Columbia Water Company). **Penna. Water Works Operators' Assn.** (Eastern Section). Sec'y-Treas., I. M. Glace, 22 South 22nd St., Harrisburg, Pa.

Sept. 12-13—BISMARCK, N. D. (Grand Pacific Hotel). **North Dakota Water & Sewage Works Conference.** Sec'y-Treas., K. C. Lauster, State Department of Health, Bismarck, N. D.

Sept. 13-14—PITTSBURGH, PA. (Roosevelt Hotel). **Western Penna. Section A.W.W.A.** Sec'y-Treas., E. P. Johnson, 418 Flannery Bldg., Pittsburgh, Pa. (Joint Meeting with Western Penna. Section of Penna. Water Works Operators' Association.)

Sept. 19-20—WATERTOWN, S. D. (Lincoln Hotel). **South Dakota Water & Sewage Works Conference.** Sec'y-Treas., Glen J. Hopkins, State Board of Health, Pierre, S. D.

Sept. 19-22—POLAND SPRING, ME. (Poland Spring House). **New England Water Works Association.** (Annual Meeting.) Sec'y, Frank J. Gifford, 613 Statler Bldg., Boston, Mass.

Sept. 21-22—DENVER, COLO. (Cosmopolitan Hotel). **Rocky Mountain Section A.W.W.A.** Secretary, O. J. Ripple, Superintendent Filtration, R.F.D. No. 2, Littleton, Colo.

Sept. 24-27—ST. PAUL MINN. (Hotel St. Paul). **American Public Works Congress.** (Annual Meeting). Executive Director, Frederic Bass, 1313 East 60th St., Chicago, Ill.

Oct. 3-5—NEW YORK, N. Y. (Hotel Pennsylvania). **American Public Health Association.** (2nd Wartime Conference.) Chairman, Reginald M. Atwater, M.D., 1790 Broadway, New York, N. Y.

Oct. 12-14—PITTSBURGH, PA. (Hotel William Penn). **Penna. Sewage Works Association.** Sec'y-Treas., Bernard S. Bush, Kirby Health Center, Wilkes-Barre, Pa. (Joint Meeting with Fed. Sew. Wks. Assns.)

Oct. 12-14—PITTSBURGH, PA. (Hotel William Penn). **Federation of Sewage Works Associations,** Exec. Sec'y, W. H. Wisely, Illinois Building, Champaign, Ill.

Oct. 17-19—AUSTIN, TEXAS (Hotels Austin & Driskill). **Southwest Section A.W.W.A.** Sec'y-Treas., George J. Rohan, P. O. Dr. 449, Waco, Texas.

Oct. 23-24—KANSAS CITY, MO. (President Hotel). **Missouri Valley Section A.W.W.A.** Sec'y-Treas., E. L. Waterman, 104 Engineering Hall, University of Iowa, Iowa City, Ia.

Oct. 24-26—Los Angeles, Calif. (Biltmore Hotel).
California Section A.W.W.A. Secretary, Blair I. Burnson, P.O. Box 720, Oakland 4, Calif.

Oct. 26-27—Parkersburg, W. Va. (Chancellor Hotel).
West Virginia Section A.W.W.A. Secretary, J. H. Harrington, Director, Div. of Sanitary Engineering, State Dept. of Health, Charleston 5, W. Va.

Oct. 30-31—Pittsburgh, Pa. (Hotel William Penn).
Engineers' Society of Western Pennsylvania. Chairman, H. M. Olson, Hotel William Penn, Pittsburgh, Pa.

Nov. 2-4—Atlantic City, N. J.
New Jersey Section A.W.W.A. Sec'y, C. B. Tygert, Dist. Mgr., Wallace & Tiernan, Inc., Box 178, Newark, N. J.

Nov. 8-10 — Philadelphia, Pa. (Benjamin Franklin Hotel).
Four States Section A.W.W.A. Sec'y-Treas., H. Lloyd Nelson, U. S. Pipe & Foundry Co., Broad and Chestnut Sts., Philadelphia, Pa.

and

Penna. Water Works Operators' Assn. Sec'y-Treas., I. M. Glace, 22 South 22nd St., Harrisburg, Pa. (Second Joint Wartime Conference.)

Nov. 16-18—Petersburg, Fla. (Swannee Hotel).
Florida Section A.W.W.A. Sec'y-Treas., Prof. A. P. Black, University of Florida, Gainesville, Fla.

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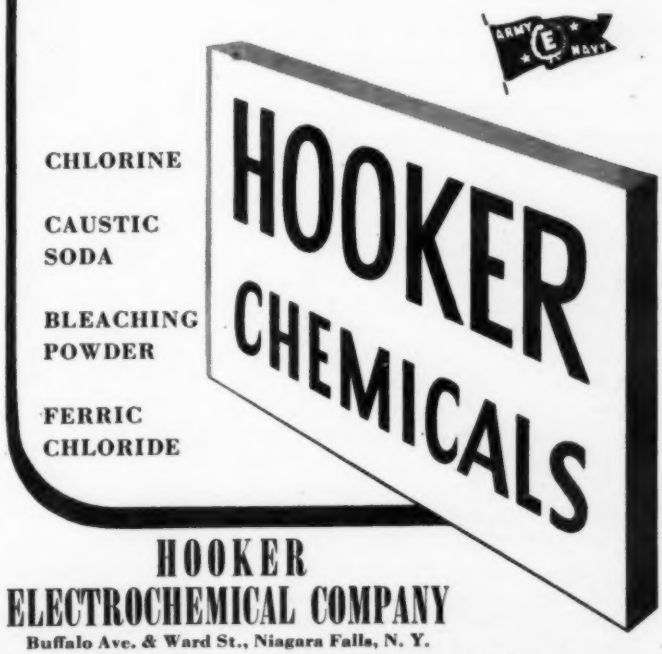
Hooker's long experience in the manufacture of chlorine has given it a knowledge of chlorination that may be helpful to you in these days of material and manpower shortages. Hooker's Technical Staff is at your service in helping to solve your sanitation and sewerage problems.



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Here and There with Doc Symons

WE know a man who has a sign in the back seat of his car reading, "This car is driven from the left front seat only." Which is to say that this column is written by the man whose name appears at its head.

What brought that on?—It seems as though something we wrote in one of these columns had some unusual effects on some of our readers:

1. Some disagreed with the idea.
2. Some thought we were mirroring another's opinions.
3. Some wrote letters about it.

Three points require three counterpoints.

1. So long as we have the right to express an opinion others have the right to agree or disagree as they choose.
2. Ideas and opinions expressed herein do not necessarily reflect the opinions of any person within or without the staff of W.W.&.S. When such freedom of expression is no longer ours, the column will cease to be.
3. We appreciate our critics writing letters about what they read in this column, *but* we wish they would write to us and not to persons who have no connections with this magazine.

"Are you listenin', Hmmm?"

* * *

Gleaned from the Circulation Dept.—Lt. Herbert E. (Boone) Hudson, former secretary of the Illinois Section, is now located in the Medical Research Lab. Bldg. 35, Edgewood Arsenal, Md.—I. M. Glace, Jr., has added another half stripe and is now Lt. (j.g.) somewhere in Hawaii.—Maj. B. A. Poole is now in Washington, D. C.—Miss Lucille Bracco, longtime secretary to the Chief Engineer and General Manager of the Los Angeles County Sanitary Districts, has severed those connections and returned to her Arizona home in Globe, Ariz. That Ch. Engr. and Gen. Mgr. she is leaving is the one and only A. M. Rawn.

* * *

May we quote dept. From the Rambler of the Automatic Control Co. comes this, "The creation of the world is told in Genesis requiring 400 words. The ten commandments are propounded in but 297 words. The immortal Gettysburg address contains 266. The Declaration of Independence, length in comparison, adequately covers a new concept of freedom in 1,321 words. The OPA uses 2,500 words to announce a reduction in the price of cabbage seed. Is brevity a forgotten virtue?"

* * *

"You are the most discourteous person I have ever met." So spoke the famed screen actor Wallace Beery to F. Wellington Gilcreas, of the N. Y. State Health Dept. Laboratories.—It happened this way. Mr. Gilcreas like many another was waiting patiently at the end of a long line to get into the diner on an east bound train from the AWWA convention. From the rear of that narrow alley along the kitchen came the booming words "Pahdon me," as the eminent actor crowded his way past the standees to the head of the line. Whereupon Mr. Gilcreas called attention of the brakeman nearby to this violation of Mrs. Post's well known book. The brakeman not being impressed by who persons are, but only by their rights, politely requested Mr. Beery to return to the end of the

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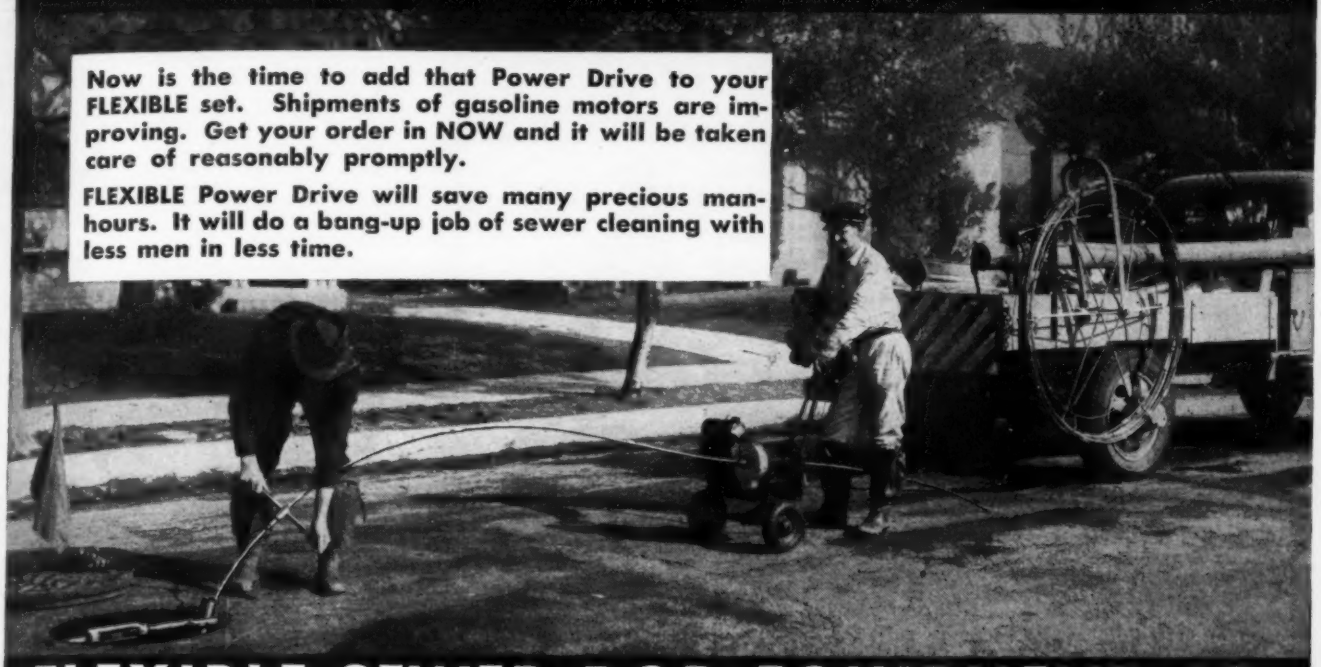

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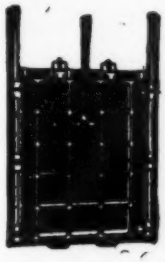

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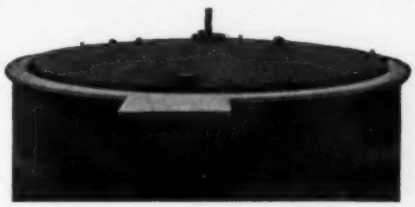

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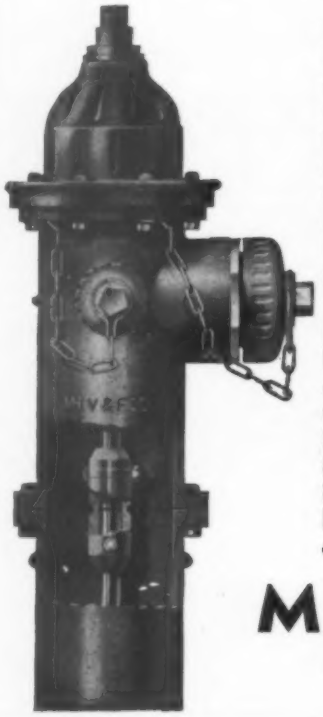

VALVES: A.W.W.A. type, iron body, bronze mounted with double-disc parallel seat or solid wedge type. Non-rising stem, outside screw and yoke, or with sliding stem and lever. Also furnished hydraulically operated. Square Bottom type operates in any position. All rugged and dependable, made of best material with highest quality workmanship.

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line. That he did and he kept right on going out of the diner to his own car, stopping only long enough to express his opinion of Mr. Gilcreas to Mr. Gilcreas.—Gil says he is sure the actor made a great many new fans that day.

* * *

AWWA Milwaukee Convention Memories: Sweltering through the long sessions in a non-air cooled auditorium halls but cooling off at lunch in the air-cooled basement, except on Tuesday when the caterer didn't show up.—Announcement that Pres. Morris was "grounded" by floods—a small red and a green light, on the stage, that came on and off for no apparent reason.—Hearing that Herb Brown, Local Host, had collapsed from nervous exhaustion.—Eating steak with too much onions at a Steak House where there was no butter and one sweetened his coffee with saccharine tablets. — Watching Fred Stuart eat the specialty of the house at Maders', the specialty being a veal shank big enough for two.—A chance meeting with the man who was senior President of our fraternity house in Madison when we were a freshman.—Bart Marshall marshalling the visitors to the water works into taxi cabs.—Prof. Lendall winning the money which was to buy a tie for Sam Newkirk, Jr., now Pres. AWWA.—Being called on the phone at 2 a. m. to come down to some room and take a picture of fifteen pairs of shoes in the middle of the room, but we were already asleep.—Never finding the person you were looking for but seeing Joe. Schwada everywhere you went.—The microphone at the Wed. evening session which didn't fit all the speakers and the comments thereon.—H.E.J. saying, "Get away boy, you bother me," but he's a privileged character with us.—J. K. Hoskins with two stars on his shoulder boards.—Alan Drake celebrating his birthday at the banquet.—Trying to take pictures in some very poor light. —Copies of *Water Works and Sewerage Ref. and Data* issue being doled out one at a time because of the paper shortage.—The ladies enjoying their entertainment.—The acrobatic dancers and the xylophonist who ate his shirt, tie and mallets, playing the "woodpile" with golf balls—rushing off in the middle of the banquet to catch a train.

* * *

Best speech of the convention was an off-the-record talk by a Major who said that water works men were missing a great opportunity when they did not improve public relations by creating a friendly attitude with the consumer. Not only should one

keep his plant in good shape and invite public inspection, but the attitude in the front office should be changed too. Instead of confronting the customer with "Pay Bills Here" as he comes in the door, change the window to read "cashier." E. L. Filby had the same idea in his paper when he said the window marked "Complaints" should be changed to read "Service" or better still "Compliments."

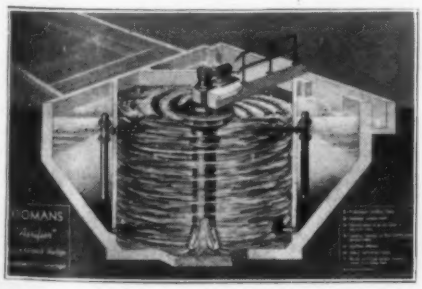
* * *

In our mail box: A recent letter contains a picture of Bill Fenger and his Ski Trooper Sergeant son, Jack, and boy is the look on Bill's face one of pride. Bill, in case you don't know *Is* the Mathieson Alkali Works to water and sewage men in Western New York. — Newspaper clippings from Mexico and Buffalo telling of the death of a onetime co-worker with us. Burrows Morey who was with us for nearly three years in Buffalo and then became Chemical Engineer for the Board of Economic Warfare in which capacity he was an important factor in U. S. chemical relations with Mexico, died in that country in May. We were proud to have had him as one of our boys and sincerely regret his passing.—We have had a number of very nice letters commenting on our May column, and we are deeply appreciative.

MANUFACTURERS' and EQUIPMENT News

Yeomans' Aerifier

Presenting a packaged treatment for the activated sludge process Yeomans Brothers Co. of Chicago have introduced the "Aerifier," a combination of aeration and final clarification in a single tank. This new piece of equipment announced in Bulletin 6650, is concrete constructed and is



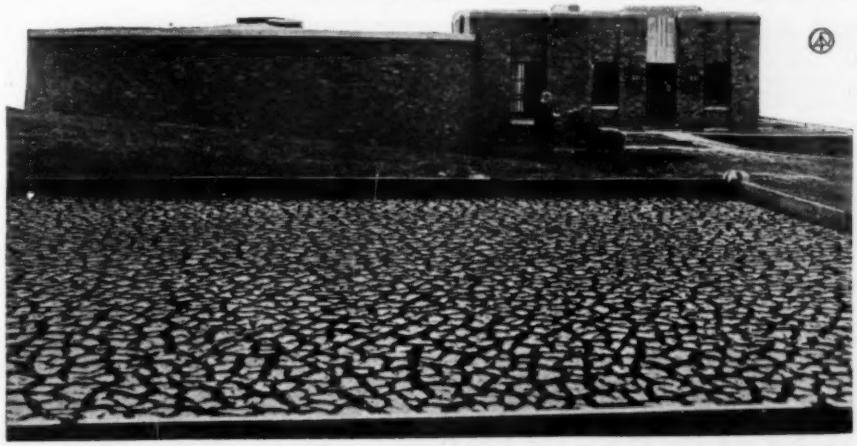
More Food Needed - Fewer People to Produce It

There will be fewer farmers and Victory gardeners this year. Yet, more food than ever will be needed. Increasing the yield from the land *that will be cultivated* will help offset this loss. Sewage sludge, properly prepared, will help to increase the yield. Other types of fertilizers are scarce—many are rationed—but there is plenty of sludge.

It takes only a Royer to convert sludge into a highly beneficial plant food for vegetables, grains, flowers, shrubs, trees and lawns. The Royer shreds sludge cake—even if moisture content is high—aerates it, removes sticks and stones and deposits it in trucks or on piles. Mixes-in enrichening chemicals if desired. Send for "Sewage Sludge Utilization Datalog."

The Royer Can Help

Model "NSO" Royer. Gasoline engine powered. 5 to 8 cubic yards per hour capacity. This, or any other model of Royer, will convert sludge like that shown below into fine, uniform, easy-to-apply fertilizer resembling sheep manure and frequently more potent.



THE ROYER FOUNDRY & MACHINE CO.
170 PRINGLE ST., KINGSTON, PA.
PIONEERS IN THE SALVAGE OF SEWAGE SLUDGE

SMITH HYDRANTS

THE A. P. SMITH MFG. CO. EAST ORANGE, N.J.

Symbol of Quality Since 1889

PROTECTOP

Trucks and motor cars back into fire hydrants every day. When this happens to a Smith Protectop Hydrant the break occurs at but one place and the only parts needing replacement are the frangible standpipe clamp and the frangible cast iron stem section. These parts cost comparatively little and full repairs can easily be made in 15 minutes. The valve is of the compression type and even should it be open at the time of the break, it will instantly close, preventing any possibility of flooding. Made in all sizes and types.

THE HYDRANT THAT CAN BREAK AT ONLY ONE PLACE

OTHER SMITH PRODUCTS
Valves and Hydrants — Valve Inserting Machines — Tapping Sleeves — Tapping Valves — Hat Flanges and Water Meters
Write for Catalog

Branches
7 So. Dearborn St., Chicago 3, Ill.
409 Texas St., El Paso, Texas
315 N. Crescent St., Flandreau, S. D.
1221 Mortgage Guarantee Bldg., Atlanta, Ga.
428 13th St., Oakland 12, Calif.
524 First Ave. S., Seattle, Wash.
1317 Oakley St., Orlando, Fla.

THE A. P. SMITH MFG. CO., EAST ORANGE, N. J.

..for ACCURACY and TROUBLE-FREE OPERATION

INSIST ON THE WILSON PULSAFEEDER

Engineered and Manufactured by

WILSON CHEMICAL FEEDERS, INC.

203 CLINTON STREET BUFFALO 4, N. Y.

STOP JOINT LEAKAGE WITH CARSON CLAMPS AND MECHANICAL JOINTS

Charcoal iron bolts for Cast Iron Pipe and Fittings. Write for Prices.

Carson-Cadillac Co.
1221 PINSON ST. BIRMINGHAM, ALA.

offered where a high degree of purification of sewage is desired in small communities and institutions. The bulletin shows the component parts of the "Aerifier" including the "Spiraflo" Aerator, the loading funnels, automatic sludge return, variable capacity control, and excess activated sludge return. For further information write Yeomans Brothers Co., 1433 North Dayton St., Chicago 22, Ill. for Bulletin 6650.

"Looks"—The All-Plastic Goggles

New all-plastic goggles, LOOKS, featuring light weight, wide vision and comfort, and durable protection for the eyes, have been announced by Mine Safety Appliances Company. Large "aviation-type" lenses afford a wide, unobstructed angle of vision.

The strong, clear plastic frame is available in two styles: a General Purpose Model, providing direct ventilation through holes at the top and bottom of the eye cups, and a Dust Model, with indirect ventilation through serrated lens seats. All lenses are of polished sheet acetate, clear or green in color, and are quickly and inexpensively replaced. A wide elastic headband holds the goggle in place at low tension, assuring wearing ease over long periods of time.

Further details on LOOKS goggles are available in Bulletin No. CE-25, copies of which are available through this publication or directly from Mine Safety Appliances Company, Braddock, Thomas and Meade Streets, Pittsburgh 8, Pennsylvania.

Dial Thermometer with Plastic Case

A 4½-in. Phenolic plastic case dial thermometer, originally built for the shipbuilding industry, is available for other severe operating conditions.

A mercury actuated instrument, it is well suited to installations requiring a long length of tubing between

bulb and instrument. The series 53K may be had in ten different ranges. For more complete information, write the Taylor Instrument Co., P. O. Box 110, Rochester 1, N. Y.

New Taylor Buoyancy-type Instrument

With the announcement of its new Level-Buoy the Taylor Instrument Companies of Rochester, N. Y., adds to its line a buoyancy-type instrument which both controls and indicates liquid level. The new instrument employs the Taylor Fulscope

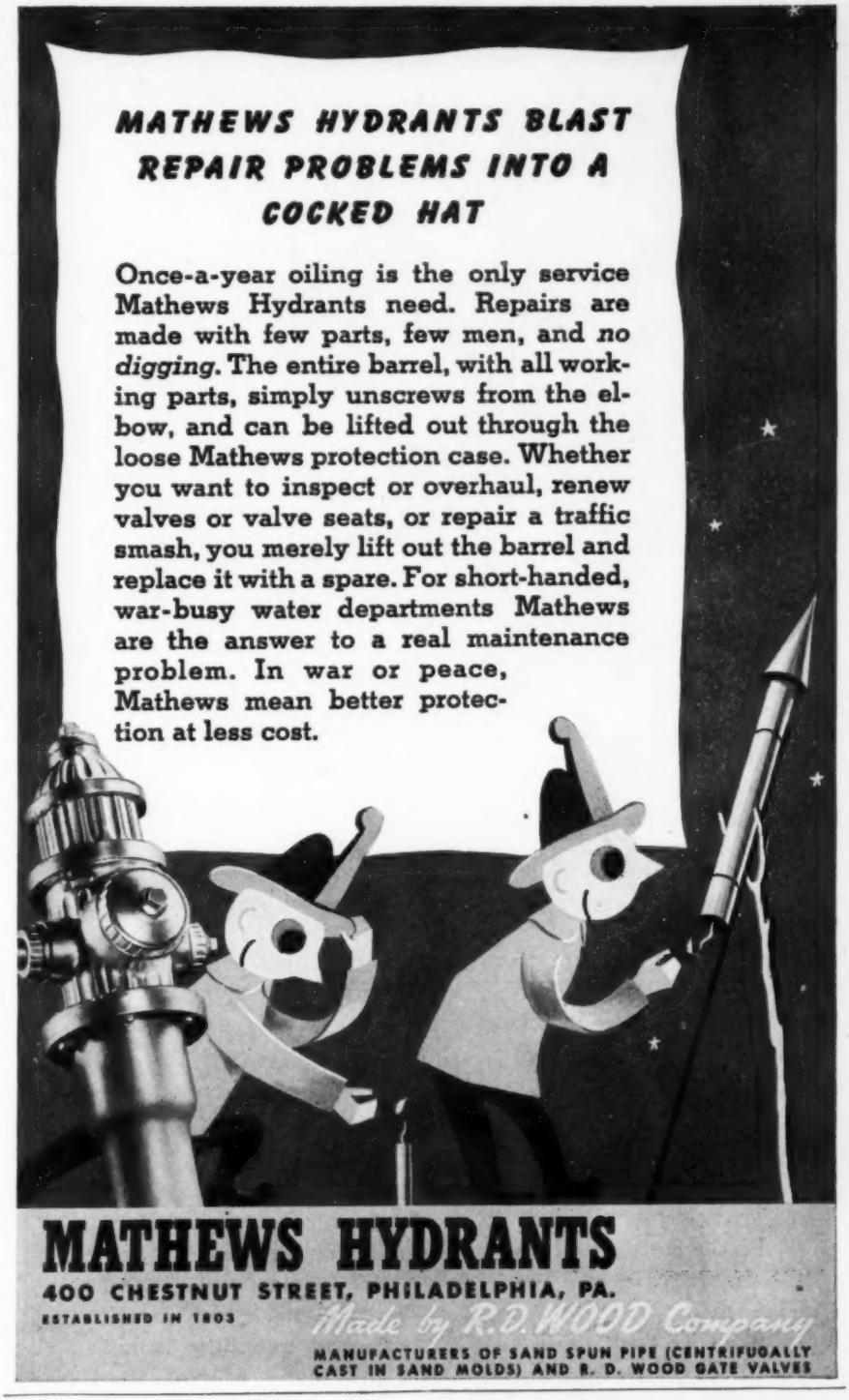
Control Mechanism with either completely Adjustable Sensitivity for smooth throttling level control, or Automatic Reset for averaging of liquid level with a minimum disturbance to the process.

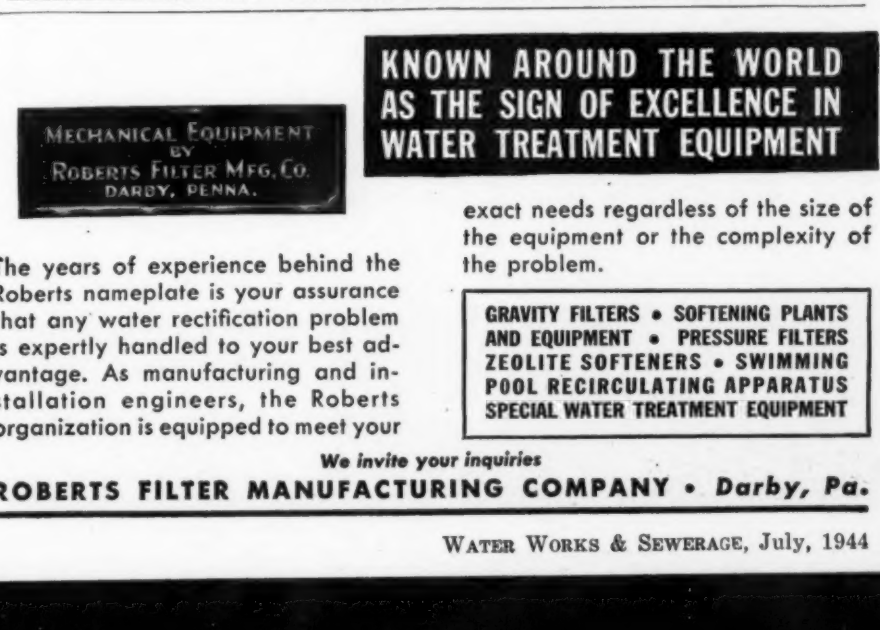
A torque tube transmits the level changes to the instrument mechanism. This eliminates a stuffing box with its need for lubrication or packing and gives a closed system which eliminates leakage. There are no internal pivots to cause friction or wear.

The Taylor Level-Buoy is available in the following standard ranges: 14", 32", 60", 72" and 120".

Gas Hammer Paving Breaker

A new gasoline hammer paving breaker originally developed for the Army is now available from The Syntron Co. These 100 per cent self contained have extreme portability, are throttle controlled, are simple in design, easy to start, capable of one man operation. The equipment includes demolition tools for breaking concrete, breaking rock, digging rock, shale, frozen ground, clay, driving sheathing, and ground rods, and back filling tamping. Information on this new gasoline hammer may be obtained from the Syntron Co., Box 220, Homer City, Pa.


MATHEWS HYDRANTS BLAST REPAIR PROBLEMS INTO A COCKED HAT
Once-a-year oiling is the only service Mathews Hydrants need. Repairs are made with few parts, few men, and no digging. The entire barrel, with all working parts, simply unscrews from the elbow, and can be lifted out through the loose Mathews protection case. Whether you want to inspect or overhaul, renew valves or valve seats, or repair a traffic smash, you merely lift out the barrel and replace it with a spare. For short-handed, war-busy water departments Mathews are the answer to a real maintenance problem. In war or peace, Mathews mean better protection at less cost.
MATHEWS HYDRANTS
400 CHESTNUT STREET, PHILADELPHIA, PA.
ESTABLISHED IN 1803
Made by R.D.WOOD Company
MANUFACTURERS OF SAND SPUN PIPE (CENTRIFUGALLY CAST IN SAND MOLDS) AND R. D. WOOD GATE VALVES


MECHANICAL EQUIPMENT BY ROBERTS FILTER MFG. CO. DARBY, PENNA.
KNOWN AROUND THE WORLD AS THE SIGN OF EXCELLENCE IN WATER TREATMENT EQUIPMENT
The years of experience behind the Roberts nameplate is your assurance that any water rectification problem is expertly handled to your best advantage. As manufacturing and installation engineers, the Roberts organization is equipped to meet your exact needs regardless of the size of the equipment or the complexity of the problem.
GRAVITY FILTERS • SOFTENING PLANTS AND EQUIPMENT • PRESSURE FILTERS ZEOLITE SOFTENERS • SWIMMING POOL RECIRCULATING APPARATUS SPECIAL WATER TREATMENT EQUIPMENT
We invite your inquiries
ROBERTS FILTER MANUFACTURING COMPANY • Darby, Pa.

DOW
FERRIC CHLORIDE
35-47% SOLUTION
Shipped in Tank Cars
60% CRYSTALS
Packed in 300 or 500 lb. Barrels
★ SLUDGE CONDITIONING
★ SEWAGE COAGULATION
★ WATER PURIFICATION
THE DOW CHEMICAL COMPANY
MIDLAND MICHIGAN

Enough For Everybody!
HAYS WATER WORKS PRODUCTS

While the men and women of our armed forces are "rubbing shoulders" with many of Hays Standard Products as well as specialized items made for the Army, Navy and Air Corps on all fighting fronts, Hays is also producing a complete line of water works materials for the "home front" in sufficient quantities to fill all of your requirements. We have never relaxed our efforts to supply whatever is needed for your services in sufficient quantities, and on time.

Our representatives are again in the field to call upon you regularly. In the meantime check up on your water works requirements. Send in your orders. We'll do our best to make shipment promptly.

OUR SEVENTY-FIFTH ANNIVERSARY

COPPER • BRASS • LEAD • IRON
HAYS *Water Works* PRODUCTS
HAYS MFG. CO., ERIE, PA. • *Since 1869*

Gordon Wiest Joins Penn Salt's Technical Service

Gordon J. Wiest, well known sanitary engineer in the Middle Atlantic District, has joined the Technical Service Department of the Pennsylvania Salt Manufacturing Co., according to an announcement by L. L. Hedgepeth, Manager of Technical Service. Mr. Wiest has specialized

Gordon Wiest

during the past 12 years on the operation of sewage and industrial waste disposal facilities. Some of his assignments have been at the sewage disposal plants at Lancaster and Chester, Pa., industrial waste disposal for the Brewster Aeronautical Corporation, and a number of special waste disposal assignments for Albright & Friel, consulting engineers in Philadelphia.

He is a native of York, Pa., a graduate of Franklin & Marshall College, and has taken graduate work in sanitary engineering at the University of Michigan and Johns Hopkins University, and is known to readers of WATER WORKS AND SEWERAGE through his articles therein.

Mr. Wiest will work in the municipal and industrial waste disposal field for the Pennsylvania Salt Co.

Two Additions to Mathieson N. Y. Office

H. P. Smith, formerly president of the George Chemical Company, and Thomas Tarpy Schulten, formerly with the General Chemical Company, have been appointed field representatives of the New York office of the Mathieson Alkali Works.

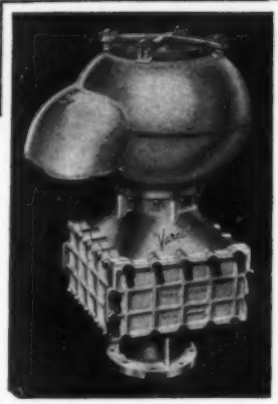
Mr. Smith has had wide experience in handling and distributing alkalies and other chemicals and is well known to users of these materials in the New York metropolitan area. He is a graduate of Columbia University.

Mr. Schulten is an alumnus of St. Mary's College, Kansas, and the University of Virginia, and pursued special studies at the Brooklyn Polytechnic Institute. He was with the General Chemical Company for eight years.

THE PACE SETTER

Mr. Sanitary Engineer:

THIS PRESSURE RELIEF & VACUUM BREAKER VALVE SHOULD BE WORKING FOR YOU



Tested-Approved-Guaranteed

The Safe Venting of Gas with the least maintenance is the job this valve performs, 24 hours a day, year in and year out. The efficiency and economy of thousands of installations throughout the world, plus years of research, have made "VAREC" approved Sewage Gas Control and Safety Devices the "Pace Setter Since 1928."

Why dont' you let this unit work for YOU?

"VAREC" Approved PRODUCTS

Flame Trap Assembly, Pressure Relief and Vacuum Breaker Valves, Flame Arresters, Waste Gas Burners, Flame Checks, Regulators, Check Valves, Sediment Traps, Drip Traps, Manometers, Explosion Relief Valves, Handhole Covers, and Sampling Hatches.

The Vapor Recovery Systems Company
COMPTON, CALIFORNIA
Branch Offices—Stocks Carried at
NEW YORK CITY — NEW ORLEANS, LA. —
TULSA, OKLA. — HOUSTON, TEXAS
Agencies Everywhere

Carborundum Opens Three Branch Offices

Through Charles Knupfer, Vice President in charge of sales, The Carborundum Company has announced the opening of three new Branch Sales Offices at Buffalo, N. Y.; St. Louis, Mo., and San Francisco, Calif. Mr. Knupfer also announces the appointment of three new District Sales Managers. G. S. Rogers in charge of the Buffalo office, Gordon O. Watson at St. Louis and W. T. McCargo at San Francisco.

Penn Salt Opens Cincinnati Office With L. M. Kuilema in Charge

The Pennsylvania Salt Manufacturing Company has announced the opening of a district sales office at Cincinnati, Ohio, in the Carew Building to serve the territory including Southeastern Indiana, Southwestern Ohio, and the major part of Kentucky.

Louis M. Kuilema, who has been appointed District Sales Manager in

L. M. Kuilema

charge of the office, was formerly with the Paper Makers Chemical Department of the Hercules Powder Co. and has been in the executive offices of that company in Wilmington, Delaware, for the past seven years.

Worthington Purchases Electric Machinery Mfg. Co.

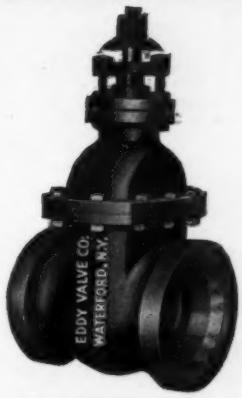
Electric Machinery Manufacturing Co., of Minneapolis, Minn., has been purchased by Worthington Pump and Machinery Corp.

Second important acquisition by Worthington within a year, Electric Machinery's major lines of synchronous motors for direct drive for a wide variety of power plant and industrial machinery, as well as electric generators for steam and internal combustion engines, provide a logical extension of Worthington's already large power and industrial equipment lines, Mr. Beaver declared.

Established in 1897, Electric Ma-

EDDY

FIRE HYDRANTS AND VALVES—
WATER WORKS EQUIPMENT



EDDY VALVES
For
Water Works
and
Sewage Disposal
Plants

EDDY FIRE HYDRANTS
For Fire Protection Service

Write for Complete Catalog

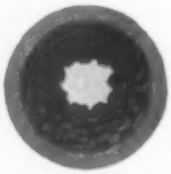
Eddy
VALVE COMPANY
WATERFORD, N. Y.

★ THE NATIONAL METHOD • OVER 35 YEARS EXPERIENCE ★

SAVE For VICTORY

★ ★ ★

EVERYWHERE Americans are being asked to "SAVE FOR VICTORY." Water works superintendents, engineers and public officials can do more in this connection by investigating the National Method of water main cleaning. This method restores the carrying capacity of pipe to at least 95 per cent of that of new mains, thereby eliminating the necessity for purchase of new mains. Aside from this the National Method makes possible lower pumping costs, greater delivery, reduced insurance rates and clean water.



Before Cleaning

The NATIONAL METHOD

After Cleaning

GUARANTEED TO RESTORE 95% ORIGINAL CAPACITY ★

The National Water Main Cleaning Co.
30 Church St. Branches: New York 7

115 Peterboro St., Boston 15, Mass.
1221 Mortgage-Guarantee Bldg., Atlanta 3, Ga.
7103 Dale Ave., St. Louis 17, Mo.
3707 Madison St., Kansas City 2, Mo.
3812 Castellar St., Omaha 5, Neb.
P. O. Box 683, Jacksonville 1, Fla.
205 West Wacker Dr., Chicago 6, Ill.
501 Howard St., San Francisco, Calif.
2028 Union Ave., Montreal, Can.
576 Wall St., Winnipeg, Can.

DON'T WASTE
Sewage Digester Gas

Sewage gas is a real *cost-cutter;* the most economical source of power and heat available for use in operating sewage treatment plant equipment. For a *continuous* supply, sewage gas is usually stored in tanks or holders during periods of peak production for use when production is low. Stacey Brothers are one of the world's foremost and oldest designers and producers of gas storage equipment in any capacity—large or small. Let us figure on your post-war requirements.

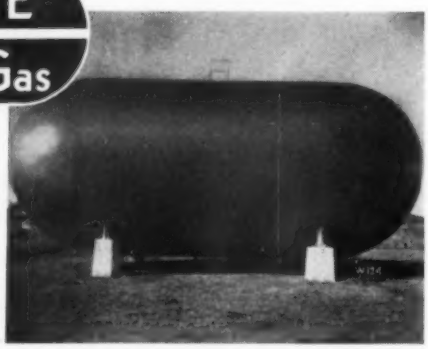


Photo shows a Stacey Brothers "Bullet". In addition to requiring less space and being unobtrusive in appearance, the comparatively low height of this high pressure gas storage tank makes for lower cost construction, erection, and maintenance.

Stacey Brothers

The STACEY BROS. Gas Construction Co.
Executive Office 5535 Vine St. Cincinnati 16, Ohio
Eastern Office 21 West St. New York 6, N. Y.

Gas Storage TANKS

ENGINEERS • FABRICATORS • RECOGNIZED EXPERIENCE & FACILITIES

chinery has developed a world-wide business in the past 47 years. During much of that time Worthington has been an important customer of Electric Machinery for its line of high quality motors for driving Worthington pumps and compressors, and electric generators for use with Worthington's extensive line of Diesel and gas engines.

Electric Machinery will continue to operate independently of the other Worthington activities.

The other recent Worthington acquisition took place in July 1943 when Ransome Machinery Co., Dunellen, N. J., became a wholly-owned subsidiary. Established in 1854, Ransome's line of road pavers, concrete and industrial mixers, and welding positioners also provided important adjuncts to existing Worthington product lines.

In addition to the Electric Machinery and Ransome acquisitions, Worthington plants are located at Harrison and Newark, N. J., Holyoke, Mass., and Wellsville and Buffalo, New York. Another subsidiary, Worthington-Gamon Meter Co., is located at Newark, N. J.

Yetman Made Division Head by Lead Industries Assn.

Homer S. Yetman, since 1938 western representative of the Metallic

H. S. Yetman

Lead Products Division of the Lead Industries Association, has been

EDSON
DIAPHRAGM PUMPS

Hand Sizes 2", 2½", 3", 4"
Power Sizes 3" and 4"
Open Discharge or Force Pump
Edson Special Suction Hose
Red Seal Diaphragms
Strainers and Foot Valves
Hose Spanners—Adapters

THE EDSON CORPORATION
Main Office and Works: 49 D St. South Boston, Mass.
New York: 142 Ashland Pl., Brooklyn

placed in charge of that Division's activities in the construction field for the entire country with headquarters at the Association's New York office. He is well known throughout the country, particularly to the plumbing and water works industries, and his promotion will be welcomed by his many friends who recognize him as an authority in his field. He assumed his new duties on May 1 and will shortly move his home from Tulsa, Oklahoma, to the East.

Chelminski Joins Gen. Amer. Process Equipment

Mr. Roman Chelminski, formerly associated with the European activities of the Dorr Company, Inc., and Oliver United Filters, Inc., and other licensors of the Dorr Company, Inc., and more recently member of the eastern sales division of the Dorr Company, Inc., has joined the staff of the General American Process Equipment.

He will be an assistant to Dr. C. L. Knowles, Technical Director, and will be located at 420 Lexington Avenue, New York City.

Pemco Advances Arens and Smith

F. C. Arens has been appointed District Manager of the Boston Office, and Richard H. Smith has been placed in charge of water meter sales for the New England territory of Pittsburgh Equitable Meter Co.

Following graduation from the University of Pittsburgh in 1931, Mr. Arens joined the firm and was assigned to production work in the liquid meter division, advancing to become Production Manager. For the past five years, Arens has been attached to the sales staff, covering

RENSSELAER
AWWA
FIRE HYDRANTS

Where "quality" is paramount, RENSSELAER is favored.

Designed to deliver a maximum amount of water in a minimum time.

Write for Bulletin W.

Formerly known as "COREYS"

DOUBLE DISC
AWWA
GATE VALVES

Engineers specify RENSSELAER with confidence. High tensile strength, corrosion resistant iron used in all hydrants and valves.

Over half a century of constant dependability. Write for Bulletin X.

Write us for Valve and Hydrant data for that POST-WAR Project.

RENSSELAER
VALVE CO.

TROY, NEW YORK

ANTHRAFILT
A Filter Medium For All Purposes

ANTHRACITE EQUIPMENT CORP.
101 Park Ave. New York

H. G. Turner Research Engineer
STATE COLLEGE, PA.

· 1879 ·
ROSS
AUTOMATIC VALVES

ALTITUDE VALVES • SURGE • RELIEF • BACK PRESSURE VALVES

FLOAT VALVES • REDUCING AND REGULATING VALVES

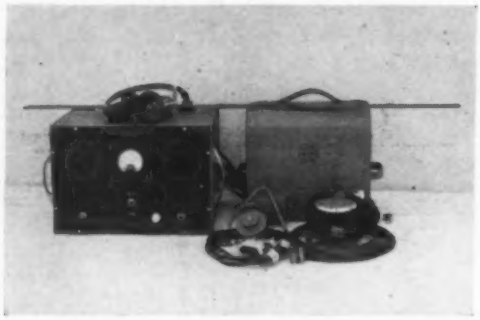
ALTITUDE VALVES
for
Control of elevation and heads into and out of tanks, basins and reservoirs.
1. Single acting.
2. Double acting.
3. Combination assembly for three or more automatic operations.

COMBINATION VALVE
Combination automatic control both directions through the valve.
A self-contained unit, with three or more automatic controls.

REMOTE CONTROL VALVE
Electric remote control—solenoid or motor can be furnished.
Adapted for use as primary or secondary control on any of the hydraulically controlled or operated valves.

ROSS VALVE MFG. CO.
INCORPORATED
P. O. BOX 595, TROY, N. Y.

M-SCOPE
Water Leak Detector



An M-SCOPE Water Leak Detector is so *sensitive* that it can spot the exact trouble point even through concrete; so *speedy* that it can test from 275 to 300 hydrants in a single day; so *accurate* that it usually hits the trouble spot "right on the nose" and *always* within a circle two to three feet in diameter.

City Water Superintendents and Army Engineers alike, these days realize the importance of conserving *water, pipe, fuel.* The M-SCOPE Water Leak Detector helps you conserve all three.

Write us for latest 16-page booklet explaining pipe locaters and leak detectors

FISHER RESEARCH LABORATORY

PALO ALTO, CALIF., U.S.A.

84" pipe—Spring Lake, N. J.

FLANGED PIPE

FLEXIBLE JOINT PIPE

BELL & SPIGOT PIPE

SPECIAL CASTINGS

SHORT BODY BELL & SPIGOT SPECIALS

Large stock enables us to make prompt shipments.

CAST IRON PIPE

SIZES 2" TO 84"

Warren Foundry & Pipe Corp.

11 Broadway, New York

Warren Pipe Company of Mass., Inc.

F. C. Arens

gas utility and industrial accounts in the New England area.

Mr. Smith has a wide background of experience in the water works field. A native of Hamilton, Mass., he joined the old National Meter Co. in 1922, and was assigned the territory comprising the three

R. H. Smith

northern New England States; Maine, New Hampshire, and Vermont. Following the consolidation of the Pittsburgh Equitable Meter Company and the National Meter Company in 1941, he was given greater responsibilities and territorial coverage in Massachusetts and Connecticut.

Hooker Appoints Chinnock to Sales Development

The Hooker Electrochemical Company has announced the appointment of A. Vaughn Chinnock to its Sales Development Department with

A. V. Chinnock

headquarters in Niagara Falls, New York.

Mr. Chinnock graduated from Cornell University in 1932 and taught science for eight years. For the past four years he has been in the Research and Development Department of the Hooker Company at its Niagara Falls Plant, where he has been actively engaged in pilot plant work in connection with developing new products to the commercial scale.

Cutler-Hammer's New Drive-In Warehouse

Cutler-Hammer, Inc., Electrical Manufacturers, of Milwaukee, recently announced the opening of a drive-in warehouse in Cincinnati, O. This is combined with a district sales office all under the management of E. C. Bolton. A complete stock of Cutler-Hammer controllers for industrial, commercial, and domestic needs will be carried in the new drive-in warehouse.

Six Firms Elected to Membership in Manufacturers' Assn.

Charlie Becker Elected A.W.W.A. Board Member

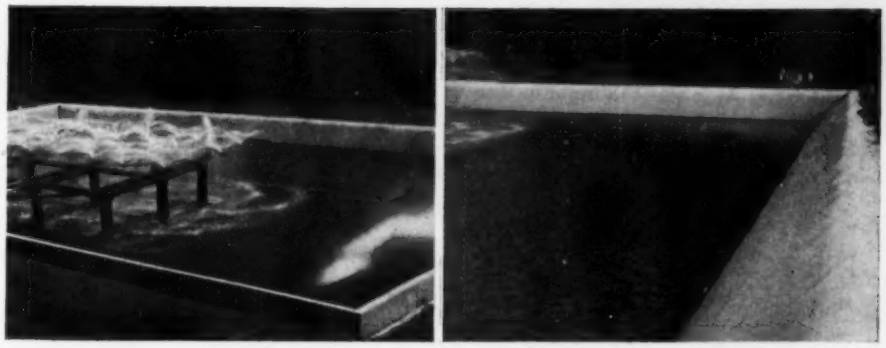
At a meeting of the Board of Governors of the Water and Sewage Works Mfgr.'s Association the following companies supplying water and sewage-works equipment were elected to membership in the Association.

Fairbanks, Morse & Co.
Mine Safety Appliance Co.
The Refinite Corporation.
Brisbane and Co.
Travers City Iron Works.
The Hardinge Co.

The election of these six firms brings the membership in the Mfr.'s Association to the all-time high of 186 members, according to Arthur T. Clark, Secy.-Manager of the Association.

At this same meeting the Board elected Chas. A. Becker, Mgr. of Sales, R. D. Wood Co., Philadelphia, to represent the Mfrs. Association on the Board of Directors of the Am. Water Works Assn. Mr. Becker is Vice-President of the Manufacturers' Assn., and serves with President McGinnis on the Joint Committee on Water and Sewage Works Development.

CEMENT GUN COMPANY
"GUNITE" CONTRACTORS
GENERAL OFFICES—ALLENTOWN, PENNA., U.S.A.



MADE BETTER THAN NEW WITH "GUNITE"

This is the filtered water reservoir of the City of Charlottesville, Virginia. Built many years ago, originally it was lined with concrete, which had disintegrated so badly, up to 1937, as to leak excessively.

Our Company was engaged to reintegrate this structure during that year. The new lining consisted of a minimum of two inches of reinforced "GUNITE" on the bottom and sides, which entirely corrected the old difficulty. Reports received this year indicate that the work is still in new condition.

Many instances of reservoir repair and construction are described in our Bulletin 2200, as well as scores of other uses. Write for a copy!

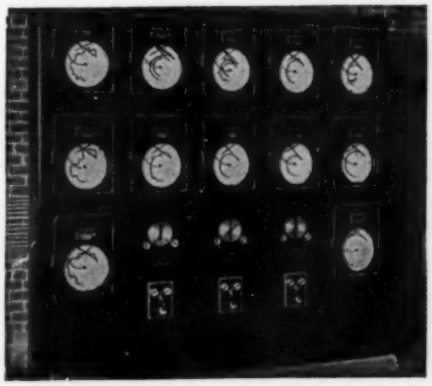
MANUFACTURERS OF THE "CEMENT GUN"

THE *Bailey Synchro-Meter* GIVES YOU *Flexibility* IN METERING APPLICATIONS

● This meter panel includes both direct mechanically operated Fluid Meters and Bailey Synchro-Meters, which are electrically operated by remote transmitters.

Wherever you have need for a central meter panel incorporating both mechanically and electrically operated Fluid Meters, it is possible to maintain uniformity and neatness by employing this system of transmitting meter and recorder readings.

MU-17



Readings of flow, pressure, temperature, liquid level and other factors are accurately and quickly transmitted from out-of-the-way places to the receiving indicator, recorder or integrator by the Bailey Synchro-Meter.

This electrical mechanism which is completely described and illustrated in Bulletin No. 194-A, can also be used to eliminate the necessity of running high pressure piping up to meter and control panels.

Write for your copy of this new Bulletin.

BAILEY METER • COMPANY •
1072 Ivanhoe Road, Cleveland, Ohio
BAILEY METER COMPANY LTD., MONTREAL

ODOR and TASTE
are health factors too...

The WATER SUPPLY that pleases nose and palate is an important contribution to community health — people drink more of it.

ESOTOO* is the answer to a simple, sure, and more economical method of controlling residual chlorine — especially in "break-point" chlorination.

ESOTOO* is the Ideal De-Chlorinator.

**ESOTOO is "Virginia's" Trade Name for Liquid Sulfur Dioxide.*

VIRGINIA

VIRGINIA SMELTING
COMPANY
WEST NORFOLK, VIRGINIA

THE *Phipps & Bird*
LABORATORY MIXER . . .

IS the important piece of equipment in the Modern Water Works Laboratory. Now being used by leaders in water works research. Many superintendents and chemists have been able to reduce their chemical costs by the control of chemical dosages with this mixer. Write for literature.

PHIPPS & BIRD, INC. Richmond, Va.

SAVE *with* TENNESSEE CORPORATION ferri-floc

Write today for actual case histories of plants now using the ideal ferric coagulant.

TENNESSEE CORPORATION
Atlanta, Georgia Lockland, Ohio

Rust Prevention Coating

An acid resisting waterproof compound is available as a preservative coating to seal small holes and waterproof pans and tanks. The material is ready mixed, needs only a brush for application, and is available in quart, gallon, and five gallon containers. Further information is available on request to George B. Klee Co., 2390 Florence Ave., Cincinnati, Ohio.

So-Lo Works Announce New Iron Cement

So-Lo Works of Loveland, O., has announced a new product "Fix-Iron" for repairing broken, cracked, or defective metal castings or piping, and for stopping leaks in boilers, furnaces, or other metal equipment.

"Fix-Iron" comes in a powder form, needs only to be mixed with water to a putty consistency. No heat is required. When applied with a putty knife or hammered into cracks it dries quickly to a permanent hardness. After hardening it is said to possess the same expansion and contraction properties as those of iron and assures permanently tight joints regardless of temperature changes. A sample or quantity of the "Fix-Iron" cement may be obtained from So-Lo Works, Loveland. Ohio.

Universal Lubricated Centrifugal Clutch

The Amalgamated Engineering & Research Corp., Chicago, better known in the trade as "Researchco," has announced a new type of automatically engaging and self-disengaging centrifugal clutch.

This new unit, which is known as the "Torkontrol," consists of a partially filled oil chamber fitted with a

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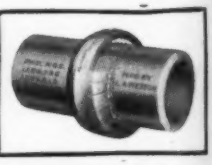

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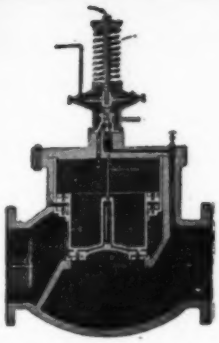

This valve installed in the upstream line automatically maintains a uniform water level within 3" to 12" variation to prevent any tank overflow; also, by means of the internal "stop check" piston assembly, prevents loss or return of storage water back through the valve—making the valve very desirable for use where metered water is purchased, or wherever it is imperative that there be no possible return flow.

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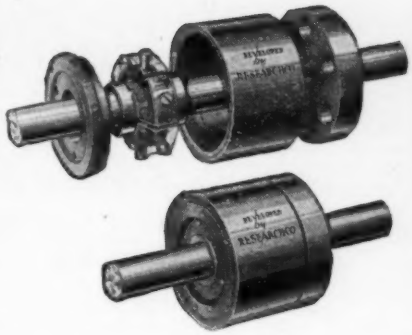

freely rotating hub, which carries a series of movable wedge shaped fly-weights. As the hub revolves these weights fly outwardly and engage the internal rims of the outer case, binding the hub and shell into a functionally solid pulley or coupling.

This unit works equally well in either direction (hence is reversible) and is "set" to engage or release at a given speed and to slip in case of overload.

"Torkontrol" clutches have been built in all sizes from ¼ H.P. to 500 H.P. for both built-in and general application.

Synthetic Rubber Industrial Gloves

Two styles of industrial gloves made from synthetic rubber are now being manufactured by the B. F. Goodrich Co., of Akron, Ohio, and may be obtained by anyone who can qualify on rubber Order R-1. One of the gloves is light-weight type of .15-in. gauge, 10½-in. length, the other is a .30-in. gauge, 14-in. in length. Sizes of the lighter glove range from 7 to 11 in halves, and of the heavier glove in sizes 10, 10½ and 11. The latter glove is available only in the straight-finger style.

Further information on these industrial type gloves, which may find a use particularly in sewage treatment plants, may be had from the B. F. Goodrich Co., Akron, Ohio.

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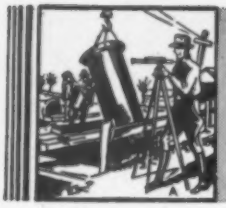

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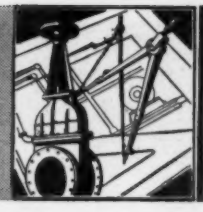

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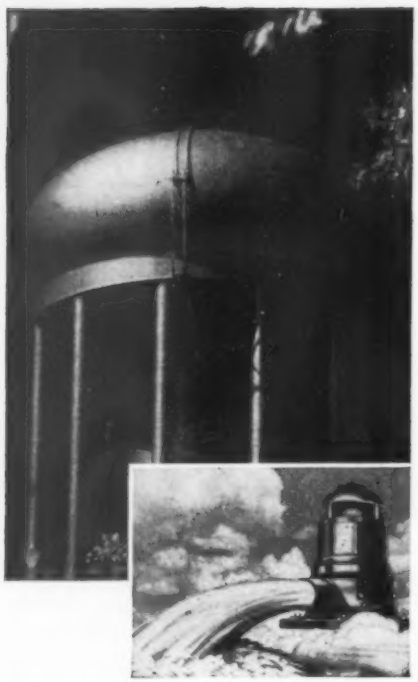

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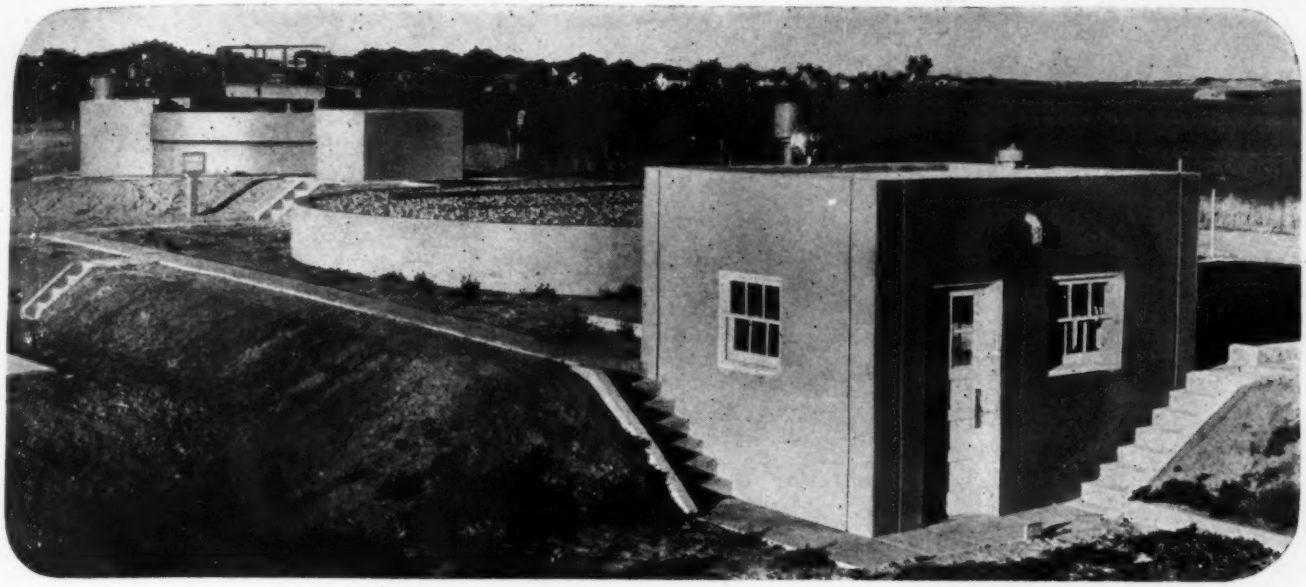

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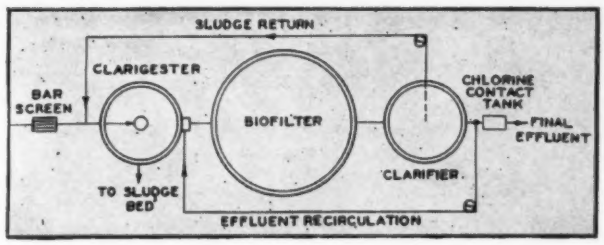

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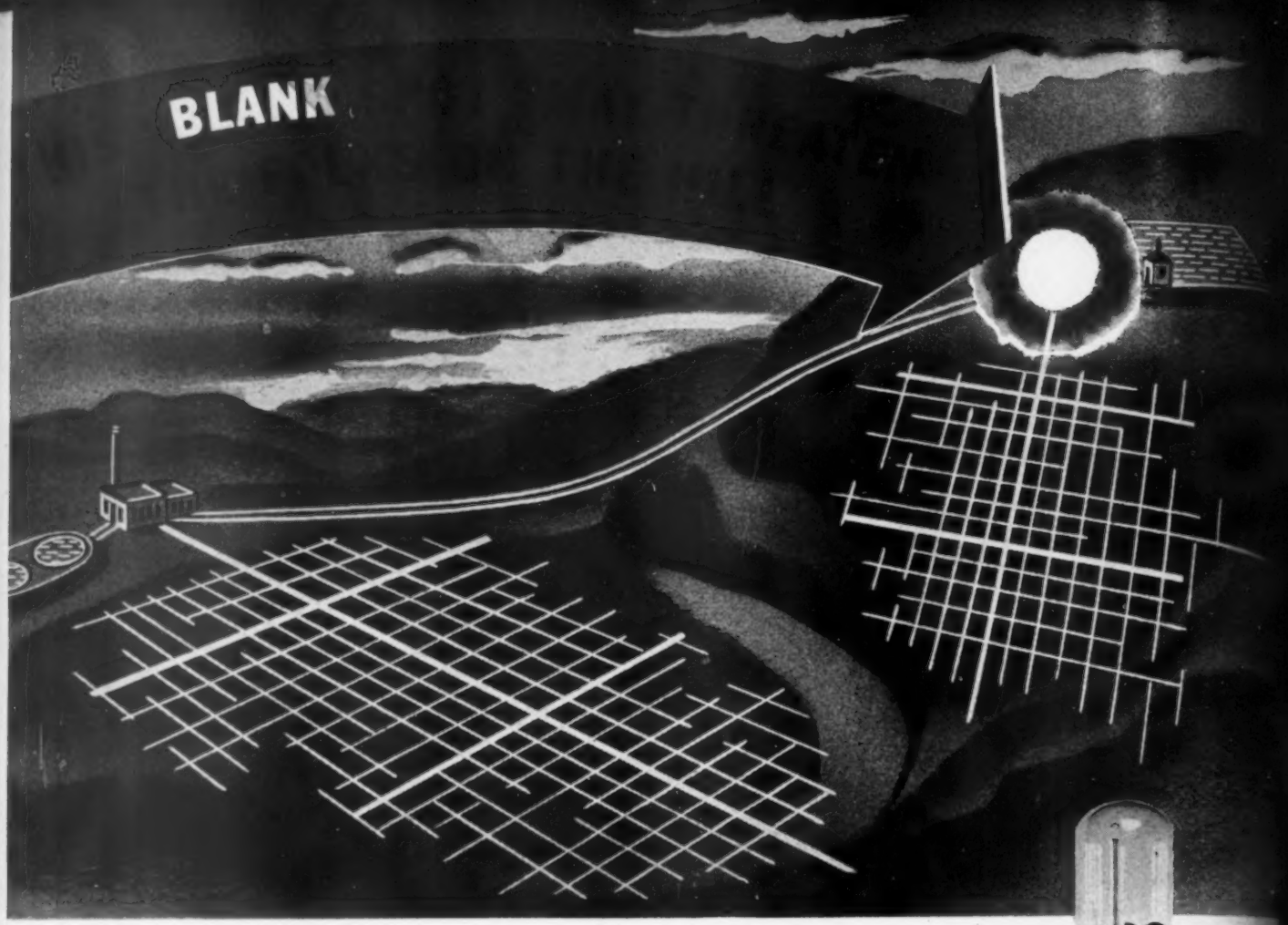

Protect them by Secondary Chlorination

● Your chlorinating equipment may be fully adequate to deliver a thoroughly safe water from your treatment plant. That open distribution reservoir on the hill, however, is a possible point of recontamination.

Many cities are taking safety-plus precautions by providing secondary chlorination at the outflows of distribution reservoirs, floating reservoirs and finished water storage basins. Such secondary chlorination helps to maintain a free chlorine residual throughout the distribution mains.

The wide operating range and protection against flow reversal, that is required for this type of service, is furnished by W&T automatic-proportioning Chlorinators.

If there is such a "blank-spot" in the protection of your water system, W&T engineers will recommend, without obligation, the most practical way to overcome it.

"The Only Safe Water is a Sterilized Water"

W&T "VISIBLE VACUUM" CHLORINATOR FOR AUTOMATIC PROPORTIONING OF CHLORINE TO THE FLOW OF WATER